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EXPERIMENTAL MUSICAL INSTRUMENTS

For the Design, Construction, and Enjoyment of Unusual Sound Sources

WHISTLING JARS AND LITHOPHONES

Above: Whistling jar from the Mochica culture of Peru (+-200AD)
See Brian Ransom's article starting on page 12.

There are lots of keyboard instruments with strings, and lots of keyboards sounded by wind. There more electronic keyboards these days than you might care to think about. But what about keyboard *idiophones*? Would you be surprised to learn that one of the most popular keyboard instruments for most of this century employed a set of tuned metal rods activated by hammers?

No, you wouldn't be surprised, because you know the instrument already: It is the toy piano. In this issue of *Experimental Musical Instruments* we have a complete history of the toy piano, provided by one of the leading proponents of the instrument in serious and not-so-serious music today, Margaret Leng Tan.

Also in this issue you will find Elias Davidsson's report on lithophones (stone chimes) in Iceland. Monte Thrasher discusses the hidden world just below the threshold of hearing, the strangely somatic domain of infrasound. Ángel Sampedro Del Río highlights traditional wind instruments of Argentina, and their influence on his own reeds and flutes of bamboo. And what about the drum-playing skeleton figure in the photo at left? It is an ancient Peruvian whistling jar, the subject an article by ceramic artist Brian Ransom.

And, as always, we have reviews, letters, and much more in this issue of EMI. So open, and read.

I JUST RECEIVED several copies of back issues of *EMI* in an attempt to complete my collection before it disappears off the face of the earth (Yes the earth has a face!) I must congratulate the editor on producing such a consistently quality magazine full of so much information from all over and with such a touch of humor in much of the writing. Apart from all this very positive stuff I did begin to notice a certain repetitive theme. It goes something like this — Man (usually) builds original instrument from conglomeration of junk and or hardware resulting in interesting sculpture. Not much attention paid to aspects of sculpture relating to acoustic properties, i.e. efficient design for sound production. Man adds electric pickups to sculpture and possibly connects them to electronic effects processing, pedals, knobs, etc., etc.

This issue of the electric pickup seems to get overlooked. In the 50s John Cage was gluing pickups to almost anything he could get his hands on — daffodils, tables, chairs. What strikes me about Cage however is that he never attempted or claimed to "build" an instrument. The act of putting pickups is the act of attaching an electrical devise to an object and therefore transforming it into a louder object. It seems that simple to me. So many articles I've come across in *EMI* report a whole process of creating an original sculpture and then whoops! What's that at the end of the paragraph — I use so and so pickup and a digital delay and flanging unit attached to my MIDI overdrive preamp distortion and volume pedal which I usually have set on 11.

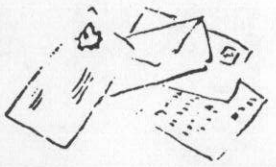
I would even go as far as to say that whoever claims to have invented the electric guitar did not invent anything at all. He merely took the guitar and added a pickup. The pickup is the musical instrument! That's why an electric guitar can be any shape and be cut from a hunk of solid wood. The basic idea of the guitar has been around for centuries. Now it's louder, that's all. The flanger, the distortion box, etc. etc.? These are instruments too.

Personally I prefer the Cage approach. Oh, excuse me, I'm just off into the other room to plug in my cactus.

— Peter Whitehead

P.S. I love Cage's idea that anything is an instrument, but the act of contriving a device that doesn't sound particularly good unless you amplify it seems to me to be kind of a backward step from really appreciating the sonic possibilities of everyday objects.

A SUGGESTION: I picked up some 1/2" neodymium magnets (nickel plated) from Lee Valley Tools in Vancouver hoping they'd be strong enough to hold a kalimba-like array to the sound board of my guitar (so as not to have to drill any holes). They weren't — but I discovered another use for them that you might find worth investigating. One of these rare-earth magnets sits quite nicely over two guitar strings. I have found that if it is positioned such that about 2/3 of the magnet rests on the sounding side of the bridge saddle, a tasteful bit of distortion (harmonic?) is there for the playing with. Generally it is the lower of the 2 strings (in relation to the ground) upon which the effect is more pronounced and manipulable. My guitar has ebony bridge pins which I carved



with quite-oversized knobs as I like to rest the edge of my palm on them when I play - a small rubber band around the 2 pegs in front of which the magnet sits makes a workable stop to keep the magnet usefully situated. I find droney open tunings, especially where the most-affected string is a little slack, to have a high-buzzed almost feedbacky quality, not as twangy as the jawari tone of Indian instruments.

— *Lon Granger*

NOTES FROM HERE AND THERE

WINDS: Woodwind Tonehole Software on the Web

Glenn Engstrand has created *Winds*, a software program that assists in woodwind design by calculating tonehole sizes and locations for particular pitches and scales. The program's main working screen shows a grid in which the user fills in essential information about the planned instrument along with the desired pitches. Based on that data, the program determines where the toneholes should be placed in order for the instrument to yield those pitches. And what if the resulting locations aren't ergonomically acceptable? You can play around with the possibilities by manipulating certain variables as they appear on the grid, recalculating the resulting tonehole locations as you go, until you come up with something satisfactory. In particular, since tonehole diameter affects pitch, the user can experiment with changes in diameter as a way of shifting the resulting locations. To aid in this process, the program includes an "image" function which shows a picture of the proposed instrument, helping the user to judge visually whether the hole locations will be comfortably playable.

Anyone using Winds will have to keep in mind that tonehole sizing and placement is a very slippery business, and so some cautions are in order. The biggest anomaly has to do with embouchure and mouthpiece effects: Highly variable conditions at the playing end draw the resulting pitch up or down relative to what the tube resonances alone would lead you to expect. This is especially true for reed and lip-buzzed instruments. Winds tries accommodate this empirically by calling on the user to perform some preliminary pitch tests on the mouthpiece or on a hole-less prototype, and to input the resulting data.

As for accuracy, I have found Winds' calculations to range from quite accurate in many cases to not-so-accurate in others. (The greatest difficulties arise, not surprisingly, with reed instruments, and also in the higher-pitched holes of many-holed instruments.) Glenn, the software designer, suggests that the way to use Winds is not to treat its results as gospel truth, but as a guideline. In actually making an instrument according to the program's prescriptions, you can drill each tonehole too small initially, and then tune up to pitch by enlarging.

You can find Winds on the World Wide Web at http://www.sirius.com/~touchles/inside.htm. For winds to work

you'll need an internet browser that can handle Java applets. Suggested browser: Internet Explorer 3.2 or later. (There seems to be a glitch that prevents Winds from working properly with earlier versions of IE.)

CLARA ROCKMORE died on Sunday, May 10, 1998 in Manhattan at the age of 88. Ms. Rockmore was, in her day, the most accomplished and widely hailed virtuoso of the theremin; the foremost student of Leon Theremin himself. Her precision, accuracy and expressiveness in interpretting the classical repertoire have remained unmatched.

ODDMUSIC MOVES: The Oddmusic email list (formerly Oddmus) has changed to a new list server. To subscribe to this free list go to the Onelist Main Page at http://www.onelist.com and sign-up for Oddmusic. Oddmusic was created by Dr. Guy Grant as a forum for anyone interested in experimental, ethnic and unusual music and instruments.

GLASS MUSIC INTERNATIONAL

Glass Music International was founded in 1987 with the purpose of providing a link between players of glass harmonicas, musical glasses, and the great variety of other glass instrument types. GMI produces a quarterly newsletter, and sponsors a variety of events including a bi-annual glass music festival. The festivals have been held in Boston, Massachussetts; Corning New York; Munich, Germany; and Sarrenbourg, France. The next one is set for Philadelphia, April 27 - 30 in the year 2000. For more information, contact GMI vice president Elizabeth Glancy Brunelli, Harbor Point, 40 Westwind Rd. Apt. 505, Boston, MY 02125; phone/fax 617-288-6111.

CORRECTIONS

In last issue's review of The Anonymous Family Reunion book and video, we gave the publisher's address incorrectly. The book and video, as well as a range of cassette tapes from the Wi*demo*uth label, are available from Anonymous, 3809 Melwood Ave., Pittsburgh, PA 15213, USA.

FOUR ISSUES TO GO

As we announced some time ago, the June 1999 issue will be *EMI*'s last, and so with this issue we begin our final year. I hasten to remind everyone that, even after the regular publication of the magazine stops, *EMI* will continue to operate on other fronts: all back issues, along with our various books and cassettes, will remain available; the *EMI* web site will continue to be active, and also be engaging in various other instrument-related projects as well.

You can still subscribe or renew your subscription to *EMI* at any time during the final year, with the option of signing up at a prorated cost for however many issues remain, or getting a full year's subscription backdated to include all four issues of this final year. See our ad near the end of this issue's notices column for details.

Recording musicians and distributors take note: Our allotted

IN THIS ISSUE

EXPERIMENTAL MUSICAL INSTRUMENTS
For the Design, Construction and Enjoyment of Unusual Musical Sound Sources

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SUBMISSIONS: Experimental Musical Instruments welcomes submissions of articles relating to new or unusual musical instruments. A query letter or phone call is suggested before sending articles.

In each issue of *EMI* we run a list of instrument-related sites on the world-wide web that have come to our attention, under the heading "Web Sties of Interest" (see below right). That list reads a bit like a telephone book, with a minimum of annotation, so: Following here is something that readers might find easier to get a handle on. — ed.

SITE CHECK

EMI's editor Bart Hopkin has asked me to do a series on experimental musical instruments and the world wide web. Since there are only four issues of *EMI* remaining, I decided to write about interesting sites that fall into the following four categories; community, how-to, lists, and theory. You are reading a review on sites that foster community. This is by no means a complete list and there is no significance to the order.

— Glenn Engstrand

America's Shrine to Music Museum

www.usd.edu/smm/

This site is web presence for one of the leading musical instrument museums, located in South Dakota. The part that is of interest to instrument inventors is the virtual tours which feature many pictures of ancient instruments.

American Musical Instrument Society

www.amis.org/

This site functions primarily as web presence for this particular society. As such, it does not provide much of an experience for the surfer except how to become a member.

Experimental Musical Instruments

www.windworld.com/emi

Nine articles from our favorite journal on the topic are included in this tasteful site.

Musicians and Instrument Makers Forum

www.mimf.com

This site features message groups with some pretty lively and informative message threads. The exciting part comes when you click on the "enter the forum" link. Within a few clicks, I was viewing a detailed diagram on making a CPVC clarinet mouthpiece. Other topics at that time (they are constantly changing) included a glass trombone, air column xylophone, and aeolian harps. This is a great resource so go ahead and register at the site and add it's home page to your favorites. You'll be back.

Society for Amateur Scientists

web2.thesphere.com/SAS/

Although this site is not directly related to experimental musical instruments, there is some overlap. It will prove to be interesting to those inventors who have a more methodical approach. Like the MIMF site above, this site features news group software. Topics include analysis of musical tones, sounds generated by cables, booming sand dunes, and characterization of musical tones.

Mechanical Music Digest

mmd.foxtail.com

This is also a news group web site that is of interest to makers of player pianos. The most experimental stuff that I found was roll destroying devices. It has a nice keyword index.

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WEB SITES OF INTEREST

Here's this issue's web listing. In addition to these, many more web sites referring to unusual instruments are listed in previous issues of *EMI*. See also Glenn Engstrand's "Site Check" at left.

Dan Bruner's musician/experimental builder page — pictures, information, how-to: http://www.shol.com/bruner

Gerhard Finkenbeiner's glass harmonicas: http://www.finkenbeiner.com

Clayzeness Whistleworks (flutes and ocarinas of clay): http://www.clayz.com

Photos of bamboo instruments from the Fifth International Bamboo Congress, Bali 1995 (within the website for Hans Erken's Earthcare Enterprises): http://www.boofarm.com/earthcare/gallery.htm

Fellowship of Makers and Researchers of Historical Instruments: http://www.nrinstruments.demon.co.uk/fomrhi.html

Perfect Sound Forever (online music magazine) reports on Jan 1998 concert featuring several experimental builders familiar to EMI readers: http://www.furious.com/perfect/emi/expmusicalinstr.html

Pictures of many wild and wonderful variations on harmonicas: http://www.207.102.157.50/bluesharp/museum

Bluegrass musician Eric Royer's one-man band device: http://www.guitarmachine.com

World Forum for Acoustic Ecology: http://interact.uoregon.edu/medialit/wfaehomepage

Raymond Scott (the late composer and pioneering maker of electronic instruments): http://www.raymondscott.com

Fred Carlson's sympitar and other guitar variations: http://www.beyondthetrees.com

Cathedral (William Duckworth's ongoing WWW-mediated music composition): http://www.monroestreet.com/cathedral

Glass Music International http://glassmusicintl.home.mindspring.com

space for recording reviews in the remaining issues is full and more than full, so don't send us more CDs and tapes for review, because they won't get reviewed. To all who have sent recordings in the past, many thanks. While we haven't been able to review all that comes our way, it has been a great pleasure to the editor and the reviewers to hear so much creative work in the field of unusual musical instruments.

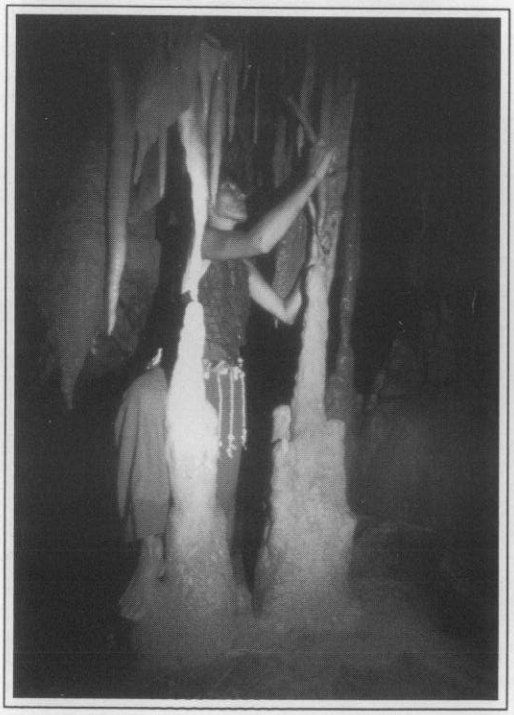
EMI'S VOLUME 13 CASSETTE WILL BE AVAILABLE SOON! YOU CAN ORDER NOW!

The latest in *EMI*'s annual cassette compilation series will become available around the first of September. The cassette, titled *From the Pages of EMI* Volume 13, presents the sounds of instruments discussed in *EMI* over the last year — that's the four issues dated September 1997 through June 1998. A wonderful mix of instruments will appear, including Skip LaPlante's styro-strings and mailing-tube drums, Scot Jenerik's fire sounds, Hohner company's claviolas played by Michael Hearst, Paul Rubenstein's homemade magnetic-pickup instruments, Uli Wahl's kite flutes, Ricardo Arias' balloons, Peter Whitehead's pan-resonated strings, John Kaizan Neptune's bamboo instruments, Martin Riches' talking machine, Frank Pahl's automatic instruments, Grant Strombeck's diverse oddities, Ellen Fullman's Long String Instrument, Niles Hokkanen's one-foot drumkit, Neil Feather's strangenesses, and Will Menter's slate instruments.

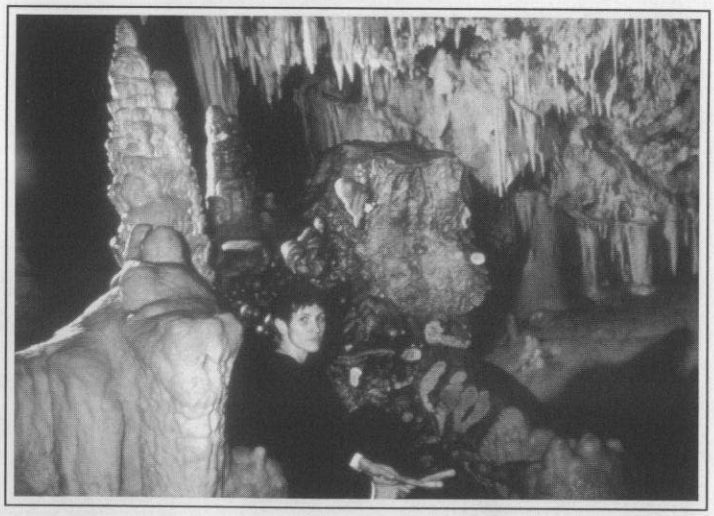
The Volume 13 cassette is available from Experimental Musical Instruments for $8. See the ad near the end of this issue's Notices section for details. You can order any time now; we'll send the tape around the start of September.

Above: Another in a series of possible instruments by Ernie Althoff

ITALIAN PERCUSSIONIST and sound artist Mariolina Zitta has been experimenting with the musical possibilities of sonorous rock formations in caves.



Mariolina Zitta in the caves



Now, working with fellow musicians Lorenzo Pierobon and Donatella Bardi, she has released the CD *Perle di Grotta: La Musica delle Stalattiti*. In it you can hear stalactites and other formations played by percussion, with echoey ambient water sounds here and there, overlain in some tracks with human voices in sustained overtone singing.

Mariolina sent these photos, showing speleological music in action. To contact her or to order the CD, fax to (international codes +) 02/327-1328 or email ascaris@iol.it.

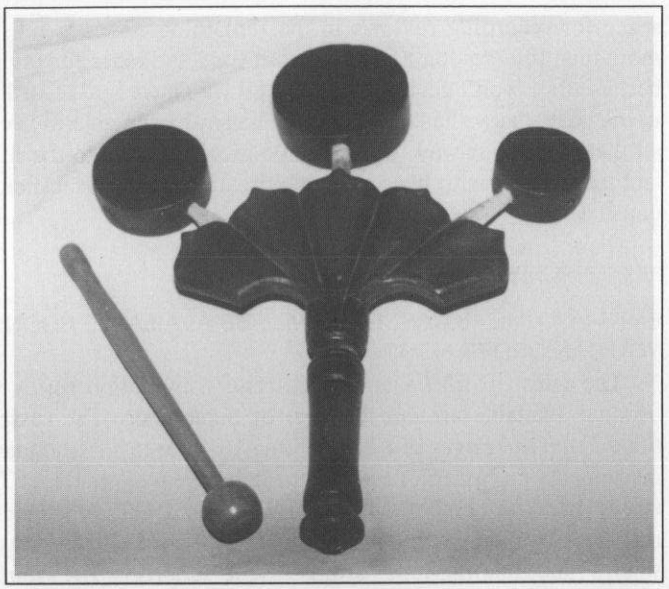
IN MEMORY OF TA THÂM

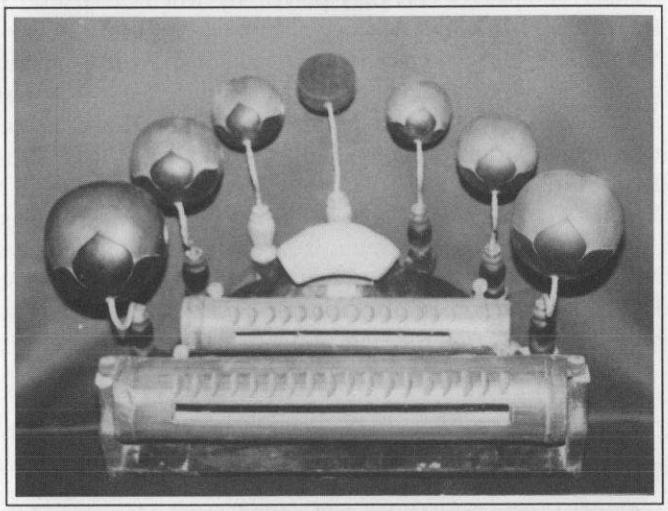
Ta Thâm, the Vietnamese musical instrument inventor featured in the September 1996 issue of *EMI*, passed away on October 19, 1997 at his home in Hanoi. He was 68 years old. After a life of adversity, his accomplishments were only beginning to known and appreciated during the last decade of his life.

His son, Ta Quang Đông, now working as a researcher of traditional Vietnamese instruments at the Musical Research Institute (Viên Nghiên cúu Âm nhac), is following in his father's footsteps as an instrument maker. His family continues to make traditional instruments in their workshop near the Hanoi Conservatory.

In memory of Ta Thâm's life and work, *EMI* here presents a few photographs of Ta Thâm's instruments.

—Jason Gibbs





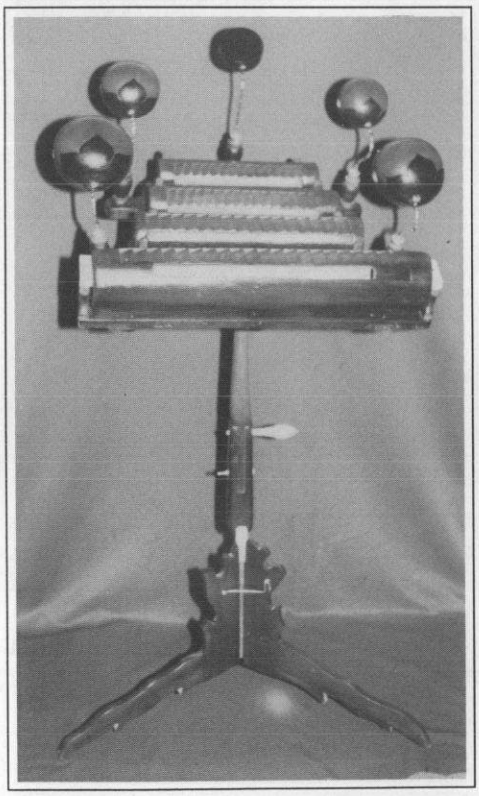
Upper right: *Chùm song loan* (invented in 1989)

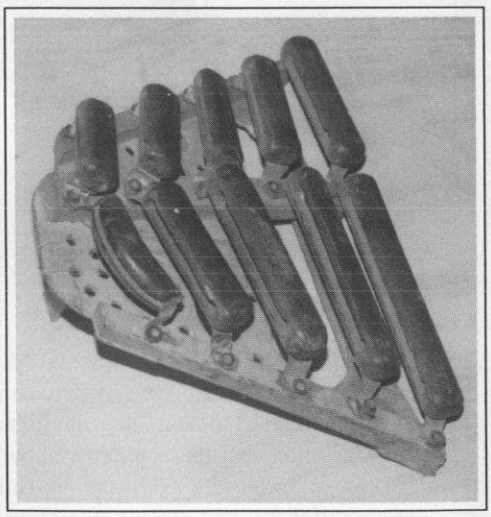
Middle right: *Chùm mõ quê* (invented in 1968)

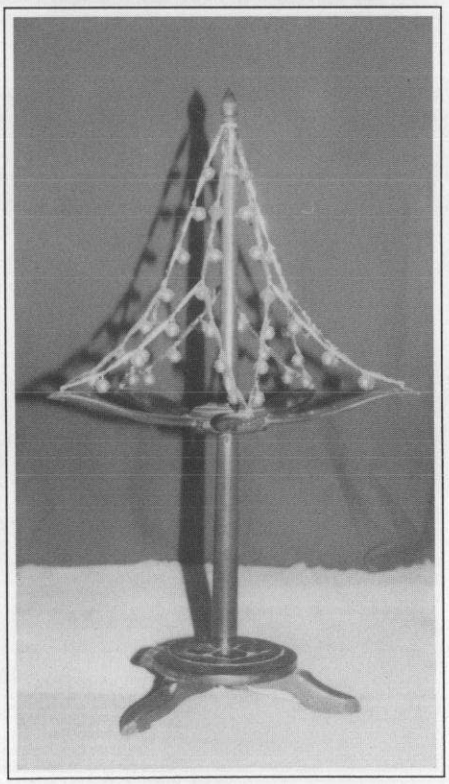
Lower right: *Chùm nhac* (invented in 1966)

Center below: *Chùm mõ canh* (invented in 1975)

Left below: *Chùm mõ nho* (invented in 1986)







Over a period of two or three years, *EMI*'s editor has been in intermittent communication with Monte Thrasher, an artist from Southern California. The crowning pieces of this correspondence have been two very long hand-written letters to *EMI* in which Monte outlined and illustrated a great wealth of ideas about sound and sound instruments. Much of the article that follows is made up of text and drawings excerpted from these letters.

Monte Thrasher is primarily a visual artist, or, perhaps it would be better to say, a visual thinker. One of his ongoing preoccupations has been popular forms of cultural expression, and the question of whether there's hope for future directions in popular culture independent of corporate control. In this connection, he sees an unexpected promise in an expansive and dynamic conception of sound sculpture. And so, although he has no background in music and doesn't think of himself as a musician, he has spent a lot of time thinking about possibilities in sound. The sound-making ideas flow rapidly from his pen, and much of what you'll see in the following pages remains in the realm of imaginings and speculation: challenging and intriguing ideas, full of potential, and as yet untried.

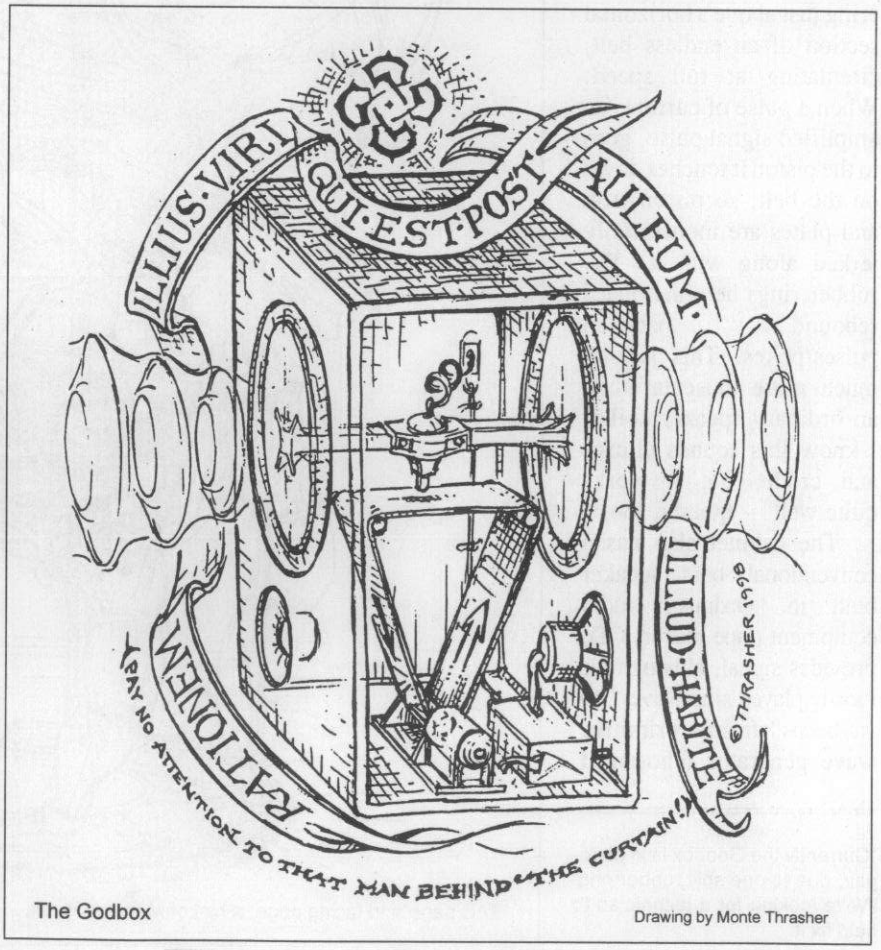
DEUS EX MACHINA

Fleshtone and the Godbox Project

By Monte Thrasher

THE GODBOX

My own work as a "para-musician" has focused on vibrations between 10 and 20Hz, produced by what my co-artist Chester Oswalt calls the *Godbox*. Musicians and psychiatrists have been tinkering with infrasound for decades, but most of the research has been concerned with its brute force aspect — for infrasound waves can involve *millions* of times the energy of audible waves. (Sound energy is figured from a known distance, since audible waves attenuate considerably over distance, enfeebled by air's inertia. Infrasound's long, penetrating waves, however, are less subject to attenuation through even the toughest material. And only large masses, vigorously shaken, produce infrasound.) Noise bands made use of, say, big steel sheets excited by industrial electromagnets, and scientists concerned themselves with just how damaging the throb of big engines or rockets were upon human subjects. No one had really concerned themselves with the *subtle* effects of infrasound upon the emotions with infra*music*. Mostly because they had no choice; when it came to making infrasound it was easy to make noise and very difficult indeed to make any subtly controlled transduction because of the horsepower involved. Infranoise makers were easy; infra-*speakers* were very tough to find. Chester and I had the good fortune to find



The Godbox

Drawing by Monte Thrasher

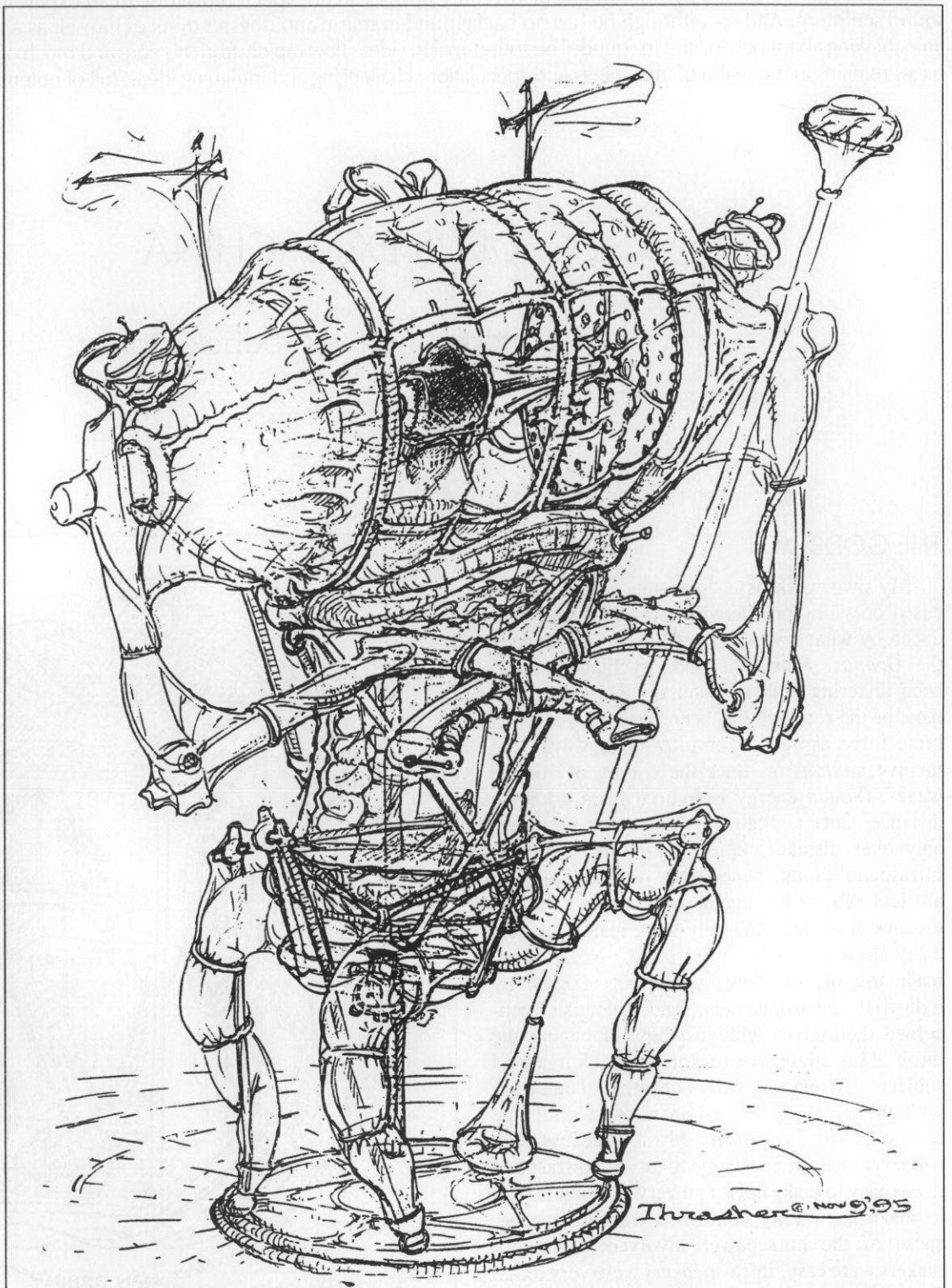
a one-of-a-kind device, originally built to play back elephant infrasound calls in the wild. Large animals — elephants, rhinos, hippos and alligators — all have calls in that range. Our device — so far as I can discover — is the Mother of all Subsubwoofers, the most powerful controlled infrasound source ever built. Mechanically, it's *belt-driven*, for ordinary speaker coils don't have enough muscle. Nor do most amplifiers; we finally found one to do the trick after months of searching, a Korean war era tube-driven device originally used for radar. The "speaker" is a box about 2' square by 4' high, with solid plates on either side. One recedes while the other protrudes, this moves the maximum amount of air.

Each 18" aluminum plate is set in a wide rubber ring glued at its edge to the rim of a 20" hole in the cabinet wall. Since it's a unique device built by a now-vanished company, Chester and I have decided not to open it up and examine its innards. According to the one sketchy schematic we got with it, it seems to work this way:

Inside the box, connecting the plates, is a rigid horizontal rod. Fixed to this rod is some kind of electro-magnet-driven piston hovering just above a horizontal section of an endless belt, circulating at full speed. When a pulse of current, an amplified signal pulse, goes to the piston it touches down on the belt, so piston, rod and plates are momentarily jerked along with it. The rubber rings help the plates rebound between pulses/pokes. This jerk is much more muscular than an ordinary speaker coil's. I know this sounds clunky and crude, but it works quite well — quietly, too.*

The cabinet also has a conventional bass speaker built in. Ordinary audio equipment (tape player, CD) provides signal, although we mostly played sine-wave "infra-beeps" from a primitive wave generator (chosen, I must confess, for its big cool Outer-Limits-era control knob, for we were, at first, very ignorant of electronics).

Our infra-beeps were quite effective, but we longed for more interesting, real-world infrasound, such as those elephant calls. The San Diego Zoo folks have recorded hours of big animal calls in search of their mating calls, in hope of putting their big beasts in the Mood for Love. We've been promised copies someday... Initially we weren't sure we'd find any infra-recordings, wondering, since no one could hear sounds that low, and without a Godbox no one could play them, would anyone bother to record



This page and facing page: a hint of Monte's visuals ... more to come.

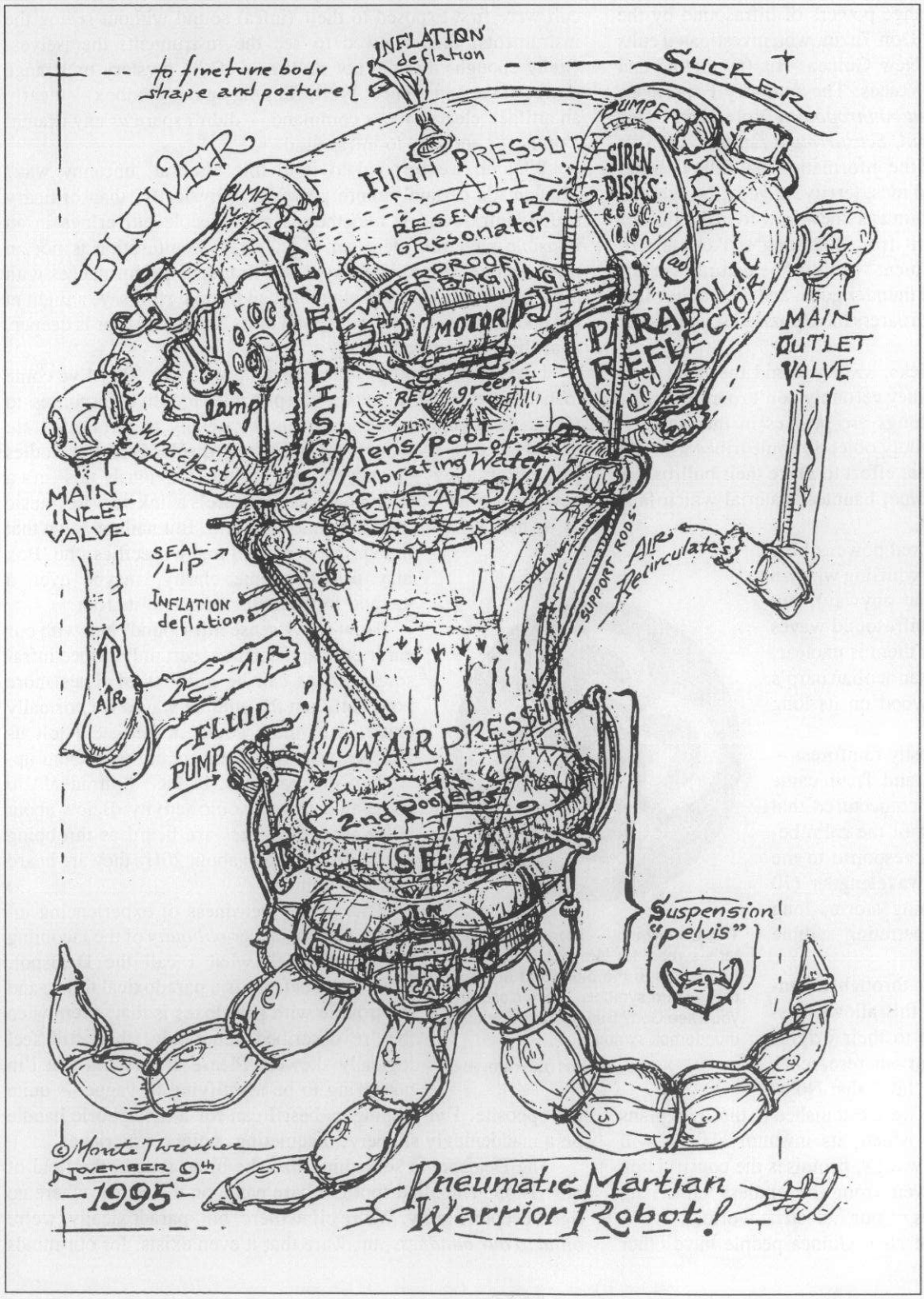
*Currently the Godbox is in disrepair, due to one split rubber ring. We're looking for a technician to help fix it.

them? But it turns out that conventional microphones can't help but respond to these long hard surging waves. In fact Nagra recorders, the workhorse of motion picture sound, are rated down to 1Hz.

(A word of warning: infrasound below 10Hz, even at moderate volume, is quite dangerous, for the natural resonant frequencies of our internal organs live in about the 5-10Hz range. One experimental acoustician was reportedly crippled for life when his organs vibrated at 7.5 Hz, rubbed together and hemorrhaged. If you want to experiment, never start without knowing your Hz. Never go below 10Hz)

Our favorite Godbox tape was Hugo Zuccarelli's *Aldebaran*, which demonstrates his revolutionary holophonic recording technique. Holophonics makes use of an understanding of the distinct and intricate way sound energies resonate within the human body, what I call *fleshtone*. More on fleshtone in a moment.

Controlled infrasound is a very strange thing to experience, magical really in a dark-and-bloody way. Yes, it is measurable acoustic energy, but one certainly doesn't sense it as such — your ears don't prick up at the onslaught, and plugging them doesn't change anything. The waves are so long that their source cannot be pinpointed — in fact infrasound seems to be everywhere at once, felt as much within one's body as outside it, so that there's no running away from it. It penetrates concrete or miles of the thickest jungle (which is very advantageous for elephants or rhinos). Chester and I hope to eventually do infrasound performances out in the open with no device in sight — it would be buried, and just as effective. The most powerful thing — emotionally speaking — about infrasound is that it literally *shakes up* the body in a frightening way. When we first threw the switch our bodies tensed up involuntarily and we ducked down our heads as if expecting the ceiling to fall on us. Not surprising behavior, really, since we live in earthquake country and much of the naturally occurring infrasound one experiences comes from earthquakes. We had the (good?) luck to hit the resonant frequency of Chester's apartment building, so the walls, floor and ceiling *shook* in an unnerving way. We fiddled with our oscillator and found that we could select what vibrated; apartment building windows were all a common size and therefore had a common resonant range — we could nearly shudder them out of their sockets. Or we could make all the doors clatter and rumble in their frames. And



all this violent ghostly activity seemed to happen on its own, for the activating energy was "hidden" in inaudibility. Some infrasound frequencies produced no audible response at all, just a queasy gut-excitement on the edge of panic. Eventually we had to shut it off, and when we did the sudden "infrasilence" felt like a moment of freefall, of vertigo, a feeling as vivid and physical as the infrasound bombardment had produced. For hours afterward we were hypersensitive to any low low sound — footsteps, the inframurmer of passing cars (both internal combustion engines and the turbulence-wakes of moving vehicles produce lots of infrasound) made us jump inside.

We were alerted to the strange powers of infrasound by the anthropological writings of Dr. Don Tuzin, who investigated cults of the thunder gods of Papua New Guinea. His fascinating and insightful article "Miraculous Voices: The Auditory Experience of Numinous Objects" (*Current Anthropology* Vol. 25 #5, Dec 1984; excerpted in *Amok Journal, Sensurround Edition*, 1995) is the primary source for much of the information that follows here. Thunder gods are the oldest and most terrifying gods, bringers of storms, lightning, fire (before humans knew how to make fire for themselves, they had to steal it from lightning strikes) and of course the most shatteringly violent sound in the natural world.

Many ancient societies have thunder gods, and their cults often have bullroarers. But why? Bullroarers have puzzled scientists for centuries.

These surfboard-shaped sticks, swung round the head on a string, don't seem to *do* much (they certainly don't roar like bulls: the curious names for these things are puzzles in themselves). They are almost always secret, holy objects. Some tribes who can barely work metal go to the great effort to make their bullroarers out of meteoric iron, an awesome, haunted material which falls burning from the very heavens.

Tuzin theorized that the sacred power of the bullroarer derived, not from its whirling whoosh (which often isn't so very loud anyway), but from the fierce, but inaudible infrasound waves it produces. (Just how it makes them is unclear; perhaps the spun string acts like an aeolian harp's wire, or the tumbling of the wood on its long axis as it spins is responsible.)

New Guinea — which is mostly rainforest — has horrendous thunderstorms, and Tuzin came to know its nuances well. He conjectured that the queasy, suspenseful feeling of the calm before the storm was the body's response to the enormously long infrasound wavelengths (70 feet or so) from an approaching storm, long before the shorter and less penetrating audible waves could be heard.

Infrasound can punch right through mountains or miles of solid rock — this allows seismologists to trace earthquakes to their origins deep underground. (Throughout our researches Chester and I encountered the "law" that Nothing Can Stop infrasound, so we were astonished to discover plans for a simple cardboard baffle which, its inventor claims, will knock it dead. This baffle, if it works, promises the construction of an *Infraquiet Room*, a haven from the endless unnerving bombardment of the infranoises of our industrial world.

Aside from bullroarers, the New Guinea people have other sacred instruments which "roar" with infrasound. The most impressive of these was said to be the voice of the spirit *Nggwal*. Twenty or thirty are played at once, at night. These are hollow, open-ended bamboo tubes four meters long and 7 cm in diameter. The operator sings mightily into one end while the other is placed in a large hourglass drum. To liken its sound to a pipe organ, Tuzin says, would not do it justice, for combined with the organ-like majesty there is the subliminally felt presence of a chillingly immense, almost human *voice*.

Interestingly, they claimed that their instruments did not mimic the voices of gods, they *were* those voices. Initiates to the cult were first exposed to their (infra) sound without seeing the instruments, then allowed to see the instruments themselves. Oddly enough, this did not spoil any of the mystery or strange power of the experience! Well, flipping on our Godbox — clearly an artifact, clearly at our command — didn't spare *us* any drama! You never get used to infrasound.

Why do we respond to it in this visceral, uncanny way? Though it's certainly more powerful, physically, than ordinary sound, infrasound is nonetheless mere feeble quiverings in an invisible medium, mere sound. Clearly acculturation is not an issue (in our culture, anyway): no inframusic performances with the kind of elaborate visual and social trappings of say, a night at the opera, cue you how to respond to it. No, the answer is deeper, something in our very flesh.

I mean this literally. After working with our 'Box I've come to believe that much of our deeply felt, intuitive responses to music, to rhythm in particular and especially to infrasound are directly tied to how our flesh shifts and displaces as our bodies move: Physiology, not psychology, is key. Obviously this isn't a new or profound idea, anyone can see there's a link between music as we hear it and dance as we move with it. But nailing down that link hasn't produced many specifics; the 'Box may provide some clarity, maybe even a method for pursuing music to its root.

The Godsymbol — Monte and Chester's symbol for *Warning: Infrasound*. Analogous to the biohazard or radiation hazard symbols. Look close and you'll see God? Based on the Buddhist thunderbolt symbol.

How do we sense infrasound? Not with our eardrums, and cochlea, certainly. Since infrasound waves can be millions of times more powerful than the audible waves we normally experience, they would immediately jolt us into deafness if our ears could pick them up. And so our ears are, in fact, "infradeaf" to about an octave of sonic activity. Below about 10Hz acoustic waves are heard as throbbing rhythms, but above about 20Hz they are heard as a low hum.

Part of the weirdness of experiencing infrasound is the queer *obliquity* of the incoming energy, through what I call the Deafspot. Now, the Deafspot is a paradoxical thing, and the trouble with paradoxes is that, even when they're described accurately, they still feel logically skewed. Please understand that I'm not trying to be mystifying of vague — quite the opposite. I'm groping as best I can for a metaphoric handle on a maddeningly slippery, disquieting, unique experience.

The Deafspot is something like the blind spot in the field of our vision. The blind spot is a bare patch on the retina, where no light receptors grow. We're blind there, but, paradoxically, we're *blind to our blindness*, unaware that it even exists, for our minds

constantly patch the gap with information gained from the sighted area surrounding it as the eye restlessly flits about. This is quite a different thing from the eye's inability to see x-rays or ultraviolet; these frequencies simply don't enter the picture, whereas the blind spot sits right there *in* the picture, unseen. Opticians have a device with which you can become aware of the blind spot, an eyepiece through which one sees two points of light on a dark field. Fix your gaze on the top light, and after a moment the other light (down below and to one side, in the position of the blind spot) will wink out. Now imagine that we add to this device a small but high-powered strobe light right behind the blind spot's light bulb, and that when the eye is properly fixed and the strobe's position is unseeable: *flash!*

This intense energy would flood your visual field but, mysteriously, be without any apparent point of origin. The burst would have no after-image hot-spot burned into your vision like a snapshot's flashbulb would create. You *would* sense it, but only obliquely through reflections within the eyeball. I hope to build this device someday, in the spirit of the 'Box.

And so the Godbox throws its force at a blind spot in our auditory range, a fierce force only sensed indirectly. It pokes you in a place you didn't know you had — and damned if you can find that spot!

Tuzin believes the feelings of vertigo due to infrasound are a clear sign that it effects our organs of balance (the vestibular system) in the inner ear. I agree, but I'm sure that *proprioception* is also involved.* The term is probably unfamiliar, even though our proprioceptive sense is very deeply rooted and almost never fails. Perhaps that's why it's so unstudied; for science studies our senses partly by how they fail: we know vision by studying blindness, hearing by studying deafness. Close your eyes and spread your arms, bend and flex them: you know their motion and position through proprioception, using sense organs at the joints and within the muscle mass.

Dancing is an exercise in proprioception — what is it's link to music? I believe that when we walk or run, the sudden smack of our heels upon the ground sends infrawaves kicking up into the body, where they bang around in an energetic slosh/shudder/wigglin' jello way, eventually echoing back to the heels. This rapid meaty sloshing back and forth has a lot to do with the timing and coordination of rhythmic bodily activity. Imagine the human body as a stick figure built of springs. Tap it on it its heels left, right, left, right. Soon the figure is making a little jogging dance; arms swing, legs kick, head bobs about, as if it's running along.

Once it's up to speed only the slightest tap is needed to keep it running. Our little spring-man has no muscles, no brain to coordinate its limbs, yet it makes this lifelike dance. Of course real bodies are immensely complex inside, but the general package is the same: a chunk with extensions, coping with rhythmic kicks. These kicks are not feeble or incidental. For every action there is an equal and opposite reaction; a man running strikes his feet to the ground with thousands of pounds of force, so the ground kicks back just as powerfully. It's too strong for Nature to ignore, she *must* have incorporated it into the operation. Machines store kinetic energy in flywheels; organisms can't make big wheel joints, so we store energy — store and usefully transform it — in the slosh and surge of our flesh. An athlete knows how to work that slosh with minimal, economic effort. Think of a pendulum swinging. Every pendulum has a natural rhythm, its period, determined by its length. Whether a broad swing or a barely perceptible one, the period is the same. The weightless instant between the end of the pendulum's rise and the start of its fall is the key to its swing. Tap it back just as it starts to fall to increase its swing. Tap it back before its upswing is completed and it will slow and eventually stop. It's not a matter of force but of timing: the better the timing, the less energy is needed. But you know this already: your brainstem, your body's deepest intuition knows it. Every child knows how to swing. And swinging your limbs, once they're up to speed, is mostly a matter of a properly timed nudge here and there, not brute effort. A good drummer knows this. You don't have to belt the drums to get a powerful beat, just tap them at the right instant. Strength, not force. And it's the echo in his flesh that guides him. His physicality is his guide. A rich, evolved, alive, supple, intimate guide.

Unfortunately, that guidance has been neglected or discarded as electronic musical instruments have spread. No one has to dance, no flesh has to echo for a drum machine to work. And now hours of tape can be filled with minutes of labor and seconds of inspiration, if that. Each new generation of electronic instruments (samplers, drum machines) requires *less* effort, thought, attention and physicality to work them. And their output gets more dreary and tedious every year, despite the music industry's propaganda to the contrary. Something precious is withering away: when was the last time you heard a genuinely catchy jingle, much less a fascinating, moving melody?

I'm from Hollywood — Burbank, actually, where the physical labor of making the world's entertainment takes place. Burbankers hang the lights and paint the backdrops. The music industry is based here too, so I can't help but feel somehow responsible for its failure. I've been waiting *twenty years* for a historically significant burst of creative activity, new kinds of music, new visuals, new art. Why hasn't it happened? The problem is in the tools of expression, in electronics. I'm drawn to Sound Sculpture because of my dissatisfaction with electronic sound. In part two of this article I'll lay out specifically what's counter-inspirational in drum machines and samplers, and outline Sound Sculpture's potential as a sweet antidote to the current bleak state of American musical culture.

*For a fascinating account of a rare case of loss of proprioception, see Oliver Sachs' the "Disembodied Woman" in his book *The Man Who Mistook his Wife for a Hat.*

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THE ENIGMA OF WHISTLING WATER JARS IN PRECOLUMBIAN CERAMICS

By Brian Ransom

In 1978, during one of my frequent visits to the library at the New York State College of Ceramics at Alfred University where I was studying at the time, I happened upon a book (its title by now forgotten) on preColumbian ceramics. In it, I read a paragraph which briefly described an ancient Peruvian artifact referred to as the whistling water jar. My curiosity about how this invention worked and how it fit into the larger picture of its culture/s in terms of history, use and distribution, left me with a burning need to investigate further. Fortunately, I got my chance to do just that the following year when I was granted a Fulbright/Hays Congressional Fellowship for research of ancient musical instruments in Peru. The article which follows has been excerpted from a larger work which I presented at the conference *Influences of Art and Architecture in preColumbian Peru* at Columbus University in 1984. As you read this, try to imagine the thrill I experienced when I first tipped one of these fluid instruments which, by and large, had not been played since before they had been placed in their graves; their mysterious and haunting sounds cracking across eons of time.

The data I used in writing this article is taken largely from a sampling of eighty-two whistling vessels which I photographed, measured, played and recorded in Peruvian museums and collections between 1978-79 (Fulbright/Hays Fellowship) and in 1982 (Oregon Arts Commission Fellowship).

The whistling water jar is an intriguing technological phenomenon within the complex conceptual structure of preColumbian ceramics which pertains to the development of both musical and ceramic art forms in the new world. This device has a long history of production. Starting as early as the formative periods in South America, we find examples of whistling jars in a wide range of cultures as far north as Mexico and as far south as southern Peru. Several hundred years after the arrival of the Spanish conquistadors in South America, whistling jars ceased to be made. Little is known of what role these jars played within the context of the ancient societies which produced them. Although most aspects of life, including ceremonies, war, sports and sexual activities, are depicted in painted and sculpted scenes on the pottery from most preColumbian cultures (most typically the Mochica of Peru), not a single known representation showing the use of a whistling water jar has been recorded. Archaeologists have long acknowledged the presence of this eccentric ceramic invention, yet little in-depth research has been done to document their development or use.

The physical appearance of whistling vessels, which are partially differentiated by whether they are the fluid type or blown type (discussed later in more detail), went through many stylistic changes during the various phases of their development in the preColumbian Americas. There is evidence suggesting that whistling vessels may have been made as far north as Mexico in Mayan times. Early whistling vessels employed only one container with two conical spouts joined by a flattened bridge (see figure 1), usually smudged grey or black by a smoky firing atmosphere, and were decorated with incised geometrical lines.

Preceding stylistic developments include the creation of whistling water vessels which were sculpted in a great variety of inventive forms. From the cultures discussed in this article, many of the most important religious deities, animals, architectural forms and scenes from life are represented. Brilliant polychromatic slip painting was used on double vessels joined by hollow tubes through which water passed, displacing air to create sound and whistles. Usually a solid clay strap supported the two or sometimes three vessels above, and a number of examples presented a stirrup spout (a horseshoe-shaped tube with another tube exiting from its apex) (see figure 2). Eventually, whistling jars became quite elaborate both in form and decoration, although their vessel size consistently ranged between eight and twenty-two centimeters. A common attribute among all of the design elements which I observed in this sample was the use of anthropomorphic and zoomorphic representations suggesting the ideology of animistic beliefs still prevalent among indigenous peoples in South America today (Borja 1951).

HOW WHISTLING JARS WORK

There are two principal types of whistling jars. The first type usually has only one vessel though it may have more than a single whistle, and must be blown to produce a sound. The whistle or whistles are normally attached in an inconspicuous fashion and may be covered or exposed (see figure 1). The makers of these jars used simple physical variations of whistle design to create precise effects of sound. Considerable changes in the whistle sound can be brought about by differences in the internal air pressure created by enclosing of the whistle and the number and size of holes in the cap allowing air to escape. Other variations such as whistle chamber size, sounding hole size and angle of air delivery were also used to produce a variety of sounds.

The second type, usually employing two or more vessels, works on the principle that fluid moving from one chamber to another displaces air in the second chamber which is forced across the sounding edge of a whistle or whistles (see figure 3). The

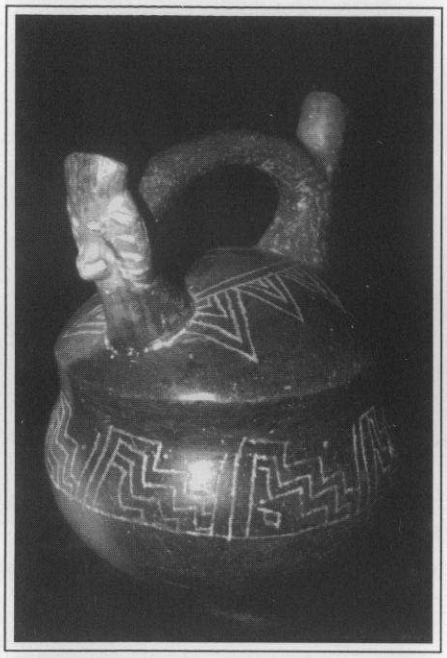


Figure 1 (above). Chavin (1200-200 BC). Blowing-type double-spout-and-bridge whistling jar, smudge fired with incised lines.

Figure 2 (below) 2. Mochica (circa 100AD). Fox playing drum. Single vessel with stirrup spout.

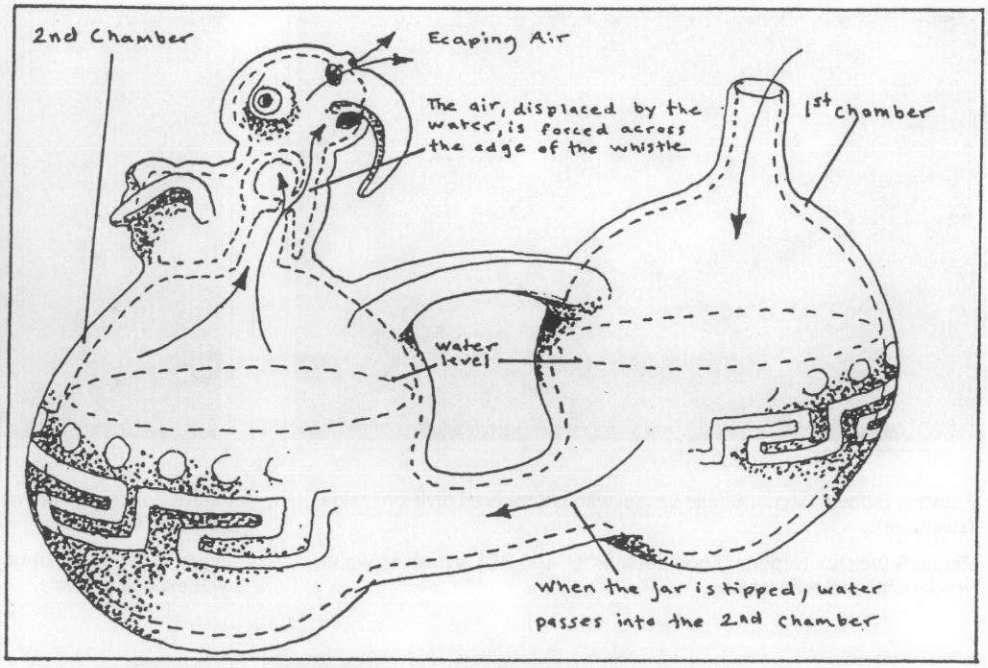
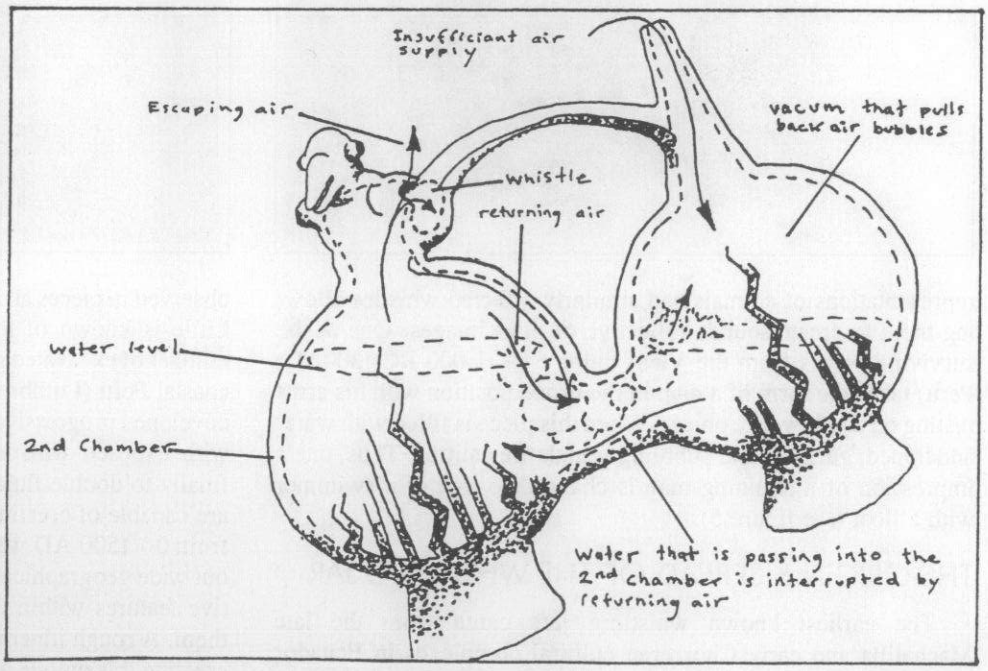


Figure 3 (above). Drawing of Vicus double-chambered whistling water vessel.

Figure 4 (below). Drawing of bird water vessel (Chancay culture).



same subtleties of sound production apply to this fluid-type whistling jar as were mentioned above in the blowing type. They appear with enclosed as well as exposed whistles. The principle difference in the sound produced by the second fluid-type jar is that the air is pushed across the sounding edge of the whistle in a very delicate manner by the moving fluid, resulting in a wavering and almost eerie sound.

An incredible variety of realistic as well as highly abstracted bird images are among the fluid-type whistling water vessels which I sampled. Surprisingly, in the vessels where sculpted bird forms appear, a warbling sound, which has an uncanny resemblance to the sound of the actual bird represented, is produced by rocking the piece back and forth. Specifically, when fluid is leaving the primary chamber and entering the secondary (whistling) chamber, a constricted air flow (as is consistently seen in these bird-type vessels) in the primary chamber forces a back draft of air returning through the whistle to the primary chamber drawing air because of the displaced water. The result is a bubbly interruption to the sound being created by the whistle/s producing sound which is very bird-like (see figure 4). Other vessels with

Figure 5 (above). Vicus. Single vessel with chambered division inside (swimmer).

Figure 6 (below). Nepeña "Lobo del Mar" (+-100 BC). Whistling water vessel with enclosed whistle.

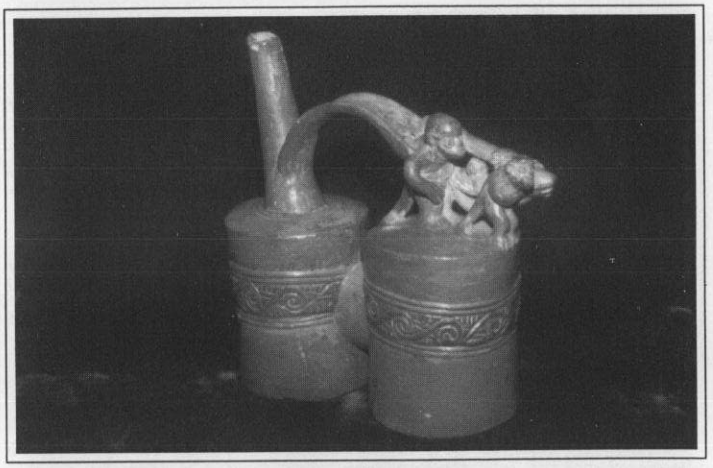


Figure 7 (above). Chimu(+-l200AD). Monkeys carrying deity in hammock. Whistling water vessel with exposed whistles.

Figure 8 (below). Lambayeque (circa 1,000 AD). Single vessel whistling jar with exposed whistle.

representations of animals had similarly affected whistles allowing them to create sounds reflective of their images. One of the surviving pieces from the Vicus culture (+-1,000 BC- 300AD, Peru) takes the form of a man in the prone position with his arms resting on a pillow-like object. When this piece is filled with water and tipped, gurgling and bubbling sounds are emitted. Thus, one's impression of a reclining man is changed to that of a swimmer with a float (see figure 5).

THE ORIGIN & SPREAD OF THE WHISTLING JAR

The earliest known whistling jars came from the late Machalilla and early Chorreran cultural complexes in Ecuador ranging from between 1200 and 900 BCE (Lathrap1975). Both of these cultures are developments of the previous Valdavia style of the same region (Feldman and Mosely1978), which in turn show influences from earlier Amazonian styles. Typically these vessels were single forms with simple decorations and double spout and bridge handles. Similar whistling vessels were made in the Chavin culture of northern Peru as early as 800 BC (see figure 1). Evidence suggests trade and idea exchange between the Chavin and Mayan civilizations. The most apparent leap in whistling jar technology after the developments in Chorreran ceramics seems to have taken place in the Vicus culture of northern Peru as observed in pieces at the Brunning Museum in Lambayeque, Peru. Little is known of this culture save the findings from a small number of excavated graves in the great sandy regions of northern, coastal Peru (Lumbreras 1964). The production of whistling jars developed progressively in Vicus times, from crude, single vessels with exposed whistles to enclosed and multiple whistles, and finally to double fluid-type vessels with enclosed whistles which are capable of creating precise animal sounds. In the time period from 0 - 1500 AD whistling jars spread cross-culturally throughout wide geographical areas evolving uniquely distinctive decorative features within the context of each culture which produced them. A rough itinerary of the cultures which have been observed creating this unique whistling artifact include Chorreren, Chavin, Vicus, Mochica, Nazca, Salinar, Nepena, Chimu, Lima, Chancay and Inca (many additional subcultures could be added to this list).

MUSIC AND MAGIC

Primitive Amazonians, and certainly inhabitants of many societies in which whistling jars were created, perceived the role of music, rhythm and reality in very different ways than we, as contemporary Americans, do today. Musical instruments were thought of as life-like. Their power resided in their voice more than shape, color or form (Borja). An example of this is found in

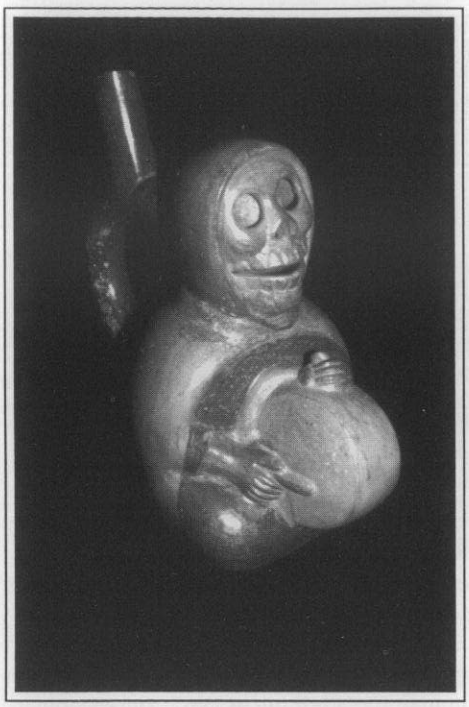


Figure 9 (left). Mochica (+-200 AD). Skeleton playing drum. Single vessel with enclosed whistle and stirrup spout.

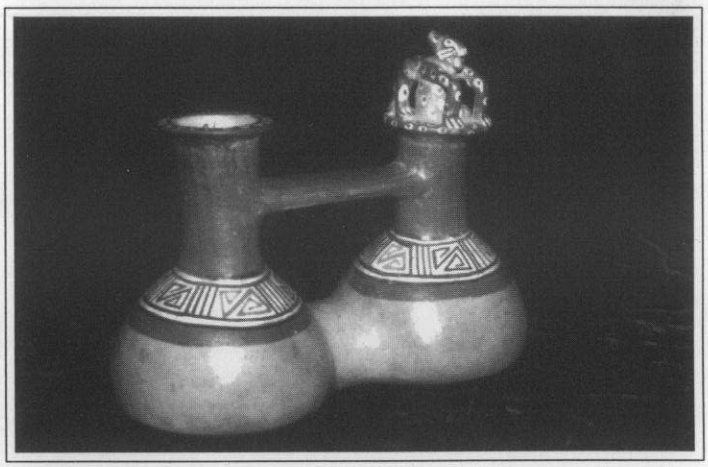


Figure 10 (right). Inca (circa 1,400 AD). Double vessel whistling water jar with exposed whistle.

a scene engraved on a conch shell from the Chavin epoch (circa 800 BC) showing a warrior blowing a shell trumpet; from the shell's opening a giant serpent emerges. The Spanish chronicler Huaman Poma wrote that in warfare the Incas believed that powerful demons and spirits were emitted from the instruments they carried with them on the battlefield (Borja). If the images depicted on the ceramics of these preColumbian cultures were thought to have the ability to exert power through contact with the deity they represented, then how natural it must have been to give that deity a voice through which to speak in the form of a whistling vessel.

Among primitive Amazonian societies, whistles are thought to have the power of conjuring spirits (Grieder 1982). The use of whistling jars in modern-day Ayahuasca ceremonies in the upper Amazon (Ayahuasca is a powerful hallucinogen made from the Banisteriopsis vine) has been well documented (Dobkin de Rios 1972). In general, it is likely that hallucinogens serving as a medium for contact with the supernatural played an important role in the ceremonial life of the cultures in which whistling jars were used. We might conjecture that affinity for hallucinogenic contact with spirits, animistic beliefs and the making of whistling vessels were all related.

SUMMARY

With the limited hard data available concerning whistling jars, we can only postulate as to the use and function of these musical artifacts. Music, ritual and contact with more-than-human realms via hallucinogenic substances as well as in everyday belief systems are prevalent among indigenous South Americans today. We can speculate that these mystical religious beliefs were also prevalent in ancient times. With these thoughts in mind, we can theorize that whistling jars were used as a means of spiritual contact. It is unlikely, though, that they were used as receptacles for hallucinogenic substances as no organic stains in the vessels have been found. The disappearance of whistling jars in colonial times suggests, though it does not prove, the theory that whatever functions or ceremonies with which the jars were associated at the time they were made were discontinued.

ACKNOWLEDGMENTS

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TOY PIANOS

No Longer Toys!

By Margaret Leng Tan

This article, in slightly different form, was first published in *Piano & Keyboard* No. 189, Nov/ Dec 1997 (PO Box 2626, San Anselmo, CA 94979-2626).

For most people the toy piano conjures up images of the *Peanuts* comic-strip character, Schroeder, hunched over his little grand piano diligently practicing the "Moonlight" Sonata. In an age when electronic keyboards hold sway, the toy piano's innocent voice and off-key poignancy hark back to the joys of a less perplexing time.

Taking the cue from John Cage's 1948 *Suite for Toy Piano*, a small but growing band of composers have, in recent years, become enamoured with the little instrument's magical timbres and are creating for it a repertory that reaches far beyond its curiosity appeal. As the toy piano makes the transition from a treasured plaything to a bona fide musical instrument, it would be interesting to take a closer look at its history.

A hybrid creation, the toy piano is a metallophone disguised as a piano ... a repackaged glockenspiel, so to speak. Its extremely simple mechanism reflects the piano's origins as a percussion instrument where keyed hammers strike steel strings. In the toy piano, steel rods replace piano strings.

Toy pianos (kinderklavier) were in existence in Germany during the nineteenth century. They were fragile instruments with glass sounding bars, a variant of the glass dulcimer.* Albert Schoenhut was a German immigrant whose father and grandfather were toy makers. Arriving in Philadelphia in 1867, age seventeen, his first job was at Wanamaker's department store where he repaired the broken glass sounding bars of German toy pianos damaged in shipping. In 1872, Schoenhut fashioned a new toy piano replacing the glass plates with steel ones which could better withstand a child's rough handling. Schoenhut then established the A. Schoenhut Company to manufacture toy pianos.

The business grew steadily and, at its zenith, boasted such a variety of styles that toy pianos alone occupied pages ten pages in the 1917 A. Schoenhut Company toy catalogue! There is, for

Margaret Leng Tan at the toy piano.

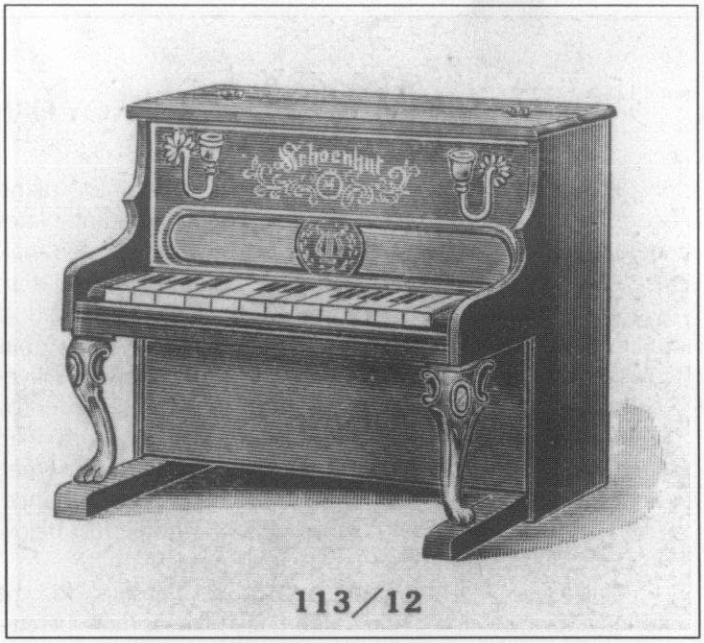
example, a rosewood-finished "extra fine upright piano" model called "Poet." "These extra fine pianos ... have very elaborate gilt-embossed panels and mouldings. The keys are imitation of ivory [sic] and a lid closes up to the keyboard. These, like all our other styles of pianos, have steel plates instead of strings, are tuned [to] perfect concert pitch and can never get out of tune." Dimensions: ht. 25", width 27", depth 13", wt. 63 3/4 lbs. The wholesale price for the three octave chromatic: $348 per dozen. These instruments would surely have retailed for a princely sum!

By this time, the A. Schoenhut Co. had expanded to include other toy musical instruments as well as high quality toys. In addition to "vocophones" (toy brass instruments), there was an impressive array of toy xylophones, chimes and glockenspiels — in short, percussion instruments that operated on the same sound-producing principle as the toy piano. In a photograph of the Schoenhut company storefront c. 1880, the sign reads "metallic toy pianos & metallophons" [sic] while the A. Schoenhut Co. trademark prominently displayed a gradated series of metal sounding plates. Through 1890, Albert Schoenhut's city directory listing vacillated between "musical instruments" and "toys." In1891 he settled on "toys."

From the outset, the Schoenhut toy piano was intended as an educational tool. This is evident in the 1919 catalog: "A Toy Piano That Plays! Even the cheapest of the 'Schoenhut' toy pianos makes real music [and] cultivates the child musician's ear and fingers." While the modest twenty-five cent, six-key upright featured in the 1889 Montgomery Ward catalogue obviously had its limitations, the more expensive models stood nineteen to twenty-four inches proud, had raised black notes instead of imitation painted ones, full-width wooden keys and a range of two to three octaves. An instruction manual taught a child such favorites as "Home Sweet Home" and "Yankee Doodle." These pianos were sold in music shops as well as in toy stores.

In true immigrant tradition, the A. Schoenhut Co. was a family enterprise. Blessed with five sons, the firm continued to prosper even beyond Albert's death in 1912. The 1929 financial crash and the Great Depression, however, led the company to declare bankruptcy in 1935. By the time of its demise, the company had produced over forty styles of the toy instrument true to the claim of its 1903 catalogue, "a piano for every purse and taste."

That same year, rising phoenix-like from the ashes of the defunct parent company, O. Schoenhut, Inc. was established by Albert's son, Otto, together with his nephew George Schoenhut. This new toy company manufactured dolls and games. Another son, Albert F., launched the Schoenhut Manufacturing Company to uphold the toy-piano-making tradition along with the manufacture of model railroad sets. This latter company was short-lived. When it folded in 1941, Otto Schoenhut took over its Castor Avenue premises and with it, the toy piano business. After Otto's death in the 1950s, his son-in-law, Robert Zimmer (married to Albert Schoenhut's granddaughter, Ruth), became president of the firm. O. Schoenhut, Inc. continued making toy pianos at the same Philadelphia address until well into the 1980s. Robert



Above and below: Toy pianos from Schoenhut's Toy and Doll Catalog of 1917, selling for $30 and $120 respectively.

Photographed by Don Strand. Courtesy the Strong Museum, Rochester, New York, Copyright 1997

Zimmer's retirement in the late '80s signaled the end of the Schoenhut family tradition of toy piano craftsmanship, a tradition unbroken for more than eleven decades.

Antique Schoenhut pianos and toys are highly prized by collectors. The Strong Museum in Rochester N.Y. houses a sizable collection of Schoenhut toys and pianos dating from the turn of the century, and there is even s Shoenhut Collector's Club and newsletter headquartered in West Seneca, New York.

Alongside that of the Schoenhut toy dynasty, there is another tale to tell — that of the Marx family.** The history of the toy piano is, in fact inextricably linked with the two great names in U.S. toy manufacture over the past one hundred years.

*The Oxford Companion to music (10th edition) describes the glass dulcimer as an instrument consisting of strips of glass struck by hammers and furnished with e keyboard. It was occasionally used in the orchestra and is described by Berlioz in his *Instrumtation*, but it's now obsolete. (Obviously, the celesta now fulfills its function.)

**There is no relationship between the Louis Marx family discussed here and the Henry C. Marx family, makers of popular and innovative string instruments in the early 1900s featured in *EMI* Vol. IX #1, Sept. 1993.

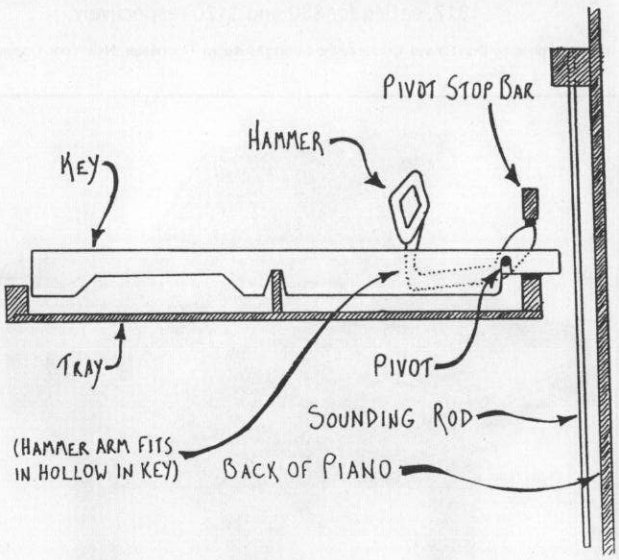
THE TOY PIANO DEMYSTIFIED

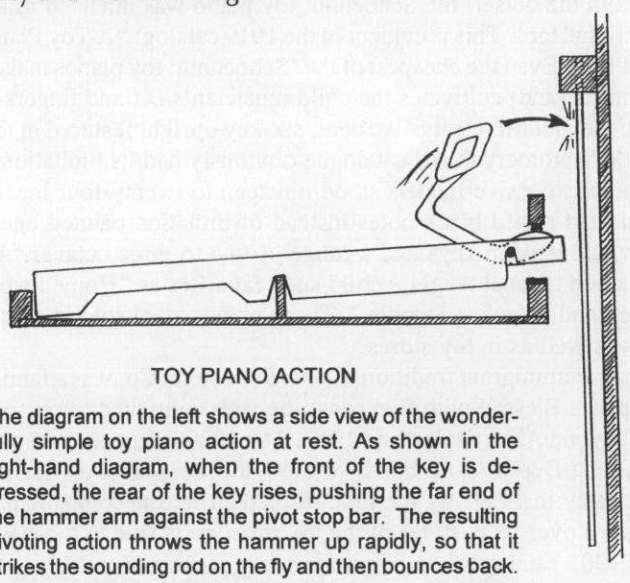
The mechanism for the original Schoenhut toy piano consisted of a series of flat, gradated steel sounding-plates held together by twine. These were struck by wooden mallets, actually round pegs which were attached to and activated by adult-width wooden keys. This produced a chime-like timbre. The modern Schoenhut toy piano has plastic keys and plastic diamond-shaped hammers. The five-eighth-inch wide sounding plates have been superceded by a set of circular rods, gradated in length, one-sixteenth of an inch in diameter, made from cold-rolled, high-carbon steel. To encourage maximum vibration and optimum resonance, each of these strong but flexible rods is reamed just below its point of insertion into a rectangular base beam.

Paralleling the modern piano's relationship to the fortepiano, the sound of the modern toy piano is more percussive than that of the early models or that of a celesta (which can aptly be described as a toy piano on valium). If anything, its penetrating voice is most akin to that of the gamelan family.

Like real pianos, toy pianos vary greatly in personality determined less by the casing materials than by the quality of the rods. Some instruments are mellow, others more light and silvery; some are full-bodied while others are tinny or brittle-sounding. In fact, I find more timbral variation between two Schoenhuts than between two Steinways!

Toy pianos cannot be tuned. Each instrument is unique because each set of rods has its own inimitable blend of overtones. The overtones of a toy piano are omnipresent and capriciously complex. They appear to bear little or no relationship to the harmonic series. While the fundamental pitches should ideally be in tune, it is the intermingling if the elaborate overtones that gives the toy piano its off-key poignancy and ineffable magic.





TOY PIANO ACTION

The diagram on the left shows a side view of the wonderfully simple toy piano action at rest. As shown in the right-hand diagram, when the front of the key is depressed, the rear of the key rises, pushing the far end of the hammer arm against the pivot stop bar. The resulting pivoting action throws the hammer up rapidly, so that it strikes the sounding rod on the fly and then bounces back.

Louis Marx was born in 1896 in Brooklyn N.Y. to German immigrant parents. Ambitious and enterprising, he had, by his twenty-third birthday, established his toy company, Louis Marx & Co. with offices at 200 Fifth Avenue, the famed "toy building," headquarters of the annual New York City Toy Convention. Over the next fifty years, Marx toys enjoyed a reputation that rivaled the house of Schoenhut.

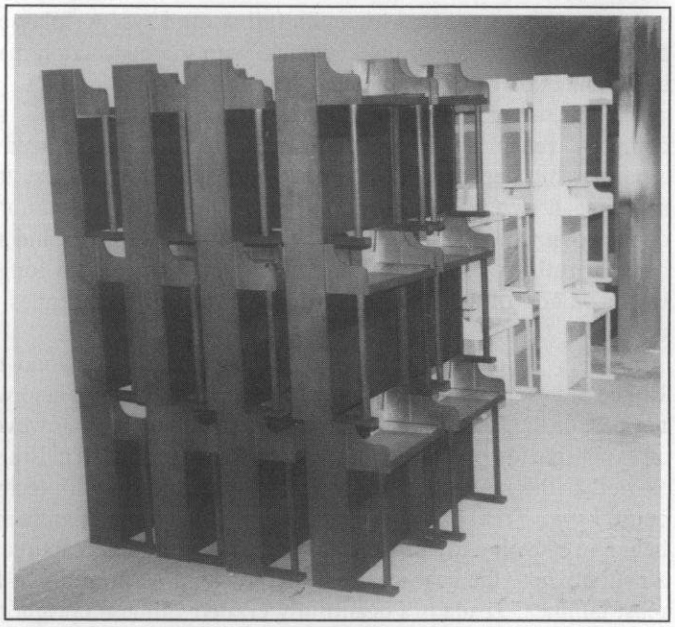
In 1923 Louis Marx helped his father, Jacob Marx, start a subsidiary toy company. Its name, the Jaymar Specialty Company, derived from that of the older Marx. Louis' elder sister, Rose, helped manage the company. Shortly before World War II, Jaymar began making toy pianos, small table models with miniature keys. After the war Jaymar switched to making toy pianos with adult-width keys, and by the mid-fifties the wooden keys and hammers had been superseded by molded plastic ones.

In 1944 Ralph Kaufman married Dorothy, Rose Marx's daughter. He joined the firm in 1946 and remained with the company into the 1980s as its top executive. I was fortunate to reach Mr. Kaufman in retirement and thus complete the toy piano's chronicle.

In the post-war decades Schoenhut and Jaymar toy pianos could be viewed as lilliputian equivalents of Steinway and Baldwin. In the late 1970s,the O. Schoenhut Company was bought out by Jaymar. However, O. Schoenhut, Inc. still retained its separate identity even while Jaymar provided all the moving parts for its pianos. Kaufman has indicated that the buy-out was a discreet affair. He recalls that the toy buyer from Woolworth's only wanted pianos bearing the "Schoenhut" name despite the fact that Jaymar and Schoenhut were, by this time, one and the same product. Both had cases fashioned from plywood but there was also a cheaper line of Jaymar pianos whose cases were made of hardboard.

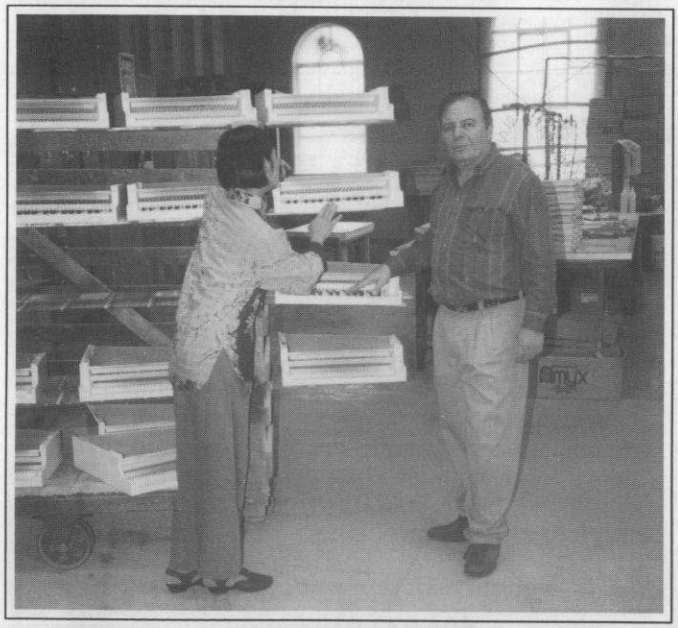
Although Louis Marx had sold his own company fifteen years prior to his death in 1982, the Jaymar Specialty Co. continued into the late 1980s retaining the Fifth avenue address where Louis Marx had started his company seventy years before. As recently

Above left: Antique Schoenhut toy pianos (1920s) at the Strong Museum, Rochester, New York



Above right: Piano frames at the Schoenhut company

Below left: Margaret Leng Tan with Frank Trinka at the Shoenhut Piano Company, Rochester, New York



Below right: Toy piano group class, Nanjing, China

as 1994, Jaymar was still listed in the building directory even though the premises had been vacated in 1993.

The 1980s witnessed a decline in the popularity of the toy piano. It became increasingly difficult for it to hold its own against the plethora of electronic keyboards with their myriad capabilities available at the touch of a button. The small digital keyboard has become for today's child what the toy piano was to previous generations. By 1985 O. Schoenhut, Inc. had ceased to exist. The Castor Avenue factory closed its doors after forty-four years. Manufacturing was relocated to Putney, Vermont along with Jaymar's Brooklyn plant. (The Jaymar factory was situated in the Bush Terminal at 36 street off Third avenue from the company's inception in 1923 until 1985.) Zimmer's retirement in the late 1980s meant the end of the Schoenhut Company as a family business. The same parallel can be drawn for the Jaymar Company when Kaufman retired in 1988.

Frank Trinca acquired the Jaymar Company along with the patents and rights to the Schoenhut name. In 1990 manufacturing was moved once again, this time to the former Hickok building in Rochester, N.Y. (Remember Hickok belts and buckles?) Now called Jaymar Toys, Inc., the company continued making jigsaw puzzles and toy pianos but, from 1993, began devoting its energies exclusively to toy pianos. These instruments bore only the Schoenhut name in its characteristic gothic lettering. Instead of the 25- and 30-key chromatic uprights prevalent in the 80s, there were now two models — the 25-key upright and a 30-key grand. Both

styles came in brown or white with full-width keys. A "play-by-color" strip coordinated the keyboard with the instruction manual's collection of nursery songs and carols.

In the summer of 1996 Jaymar Toys closed. In 1997, the company, renamed "Schoenhut Piano Company", resurfaced as a partnership between Frank Trinca and Stan Patykiewicz, formerly head technician at Jaymar Toys. They have concentrated on improving the pitch consistency of their instruments and are back in full-production. Although the toy piano is no longer in the hands of its original families, the saga continues to unfold.

The toy piano industry is quite alive and well beyond the United States. With the exception of Germany, the toy piano was not part of the European child's experience. There is, however, an expensive toy piano line, the Haring piano, produced in Brazil, as well as the Japanese counterpart, often equipped with technicolor keys. True to Albert Schoenhut's intention, China has begun to view the toy piano as a serious educational resource in a nation where the cost of a real piano would be prohibitive for most families. Zeada is a beautifully crafted Chinese upright toy instrument made in Nanjing. The young company is gaining strength as it caters to pre-school children in communal toy piano classes. Pronounced *zhi-er-da* (a phonetic transliteration of the characteristically Chinese aphorism "prosperity through knowledge"), Zeada affirms that there is still a place for the toy piano in 1998 and beyond.

Margaret Leng Tan would like to express her thanks to the following individuals for their invaluable assistance: Carol Sandler, Ellen Manyon, Don Strand and the Strong Museum, Rochester, N.Y., Ralph Kaufman, Frank Trinca, Gordon Jee at PolyGram Classics and Jazz Creative Services and my friend Milos Raickovich who so patiently taught me how to input this article into a computer.

ABOUT TOY PIANOS

Schoenhut Dolls and Toys by Susan Manos, Collectors Books, Paducah,KY 1976

Schoenhut Dolls, Toys and Circus, 1872-1976 by M. Elaine and Daniel Buser Jr., Collectors Books, Paducah KY 1976

Schoenhut Dolls: A Collectors' Encyclopedia by Carol Carson, Hobby House Press, Cumberland, MD. 1993

"The Schoenhut Toy Pianos" by Ruth H. Zimmerman, *Schoenhut Collectors Club Newsletter* ,1990

"The Toys of the A. Schoenhut Company", brochure from the Strong Museum toy and doll study collections

Schoenhut Toy and Doll Catalogue from 1917 and 1933

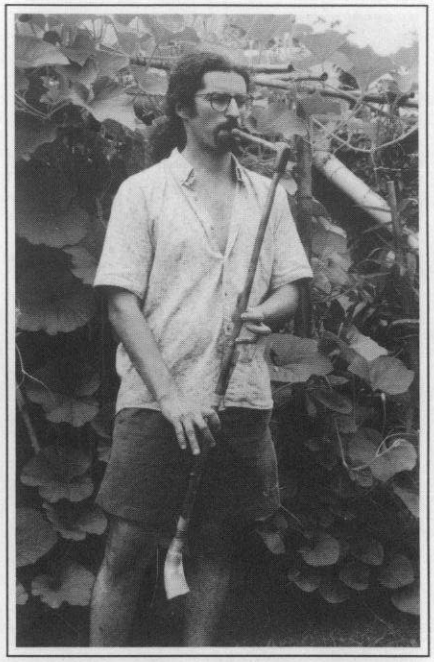
Greenberg's Guide to Marx Toys (vol 1: 1923-1950) by Maxine A Pinsky, ed. MaryAnn S. Suehle, Greenberg Pub. Co., Sykesville, MD. 1988.

The Miniature Piano Enthusiast Club was founded in 1990 by Janice E. Kelsh. The club's members meet annually at a toy and miniature piano convention. For further information contact Ms. Kelsh at 633 Pennsylvania Ave, Hagerstown MD. 21740. Tel: (301)797-7675.

Margaret Leng Tan is internationally renowned for her work with extende piano techniques. This led her to explore the toy piano as a bona fide musical instrument inspiring composers to create a broad and varied repertory for it. Ms. Tan takes her toy pianos and toy instruments to festivals worldwide creating a music theater of nostalgia and hilarity. Her latest album, The Art of the Toy Piano *(Point Music/PolyGram), was on many 1997 top ten lists.*

Margaret Leng Tan lives in Brooklyn with two dogs, three Steinways and twelve toy pianos (at last count).

Photo by Michael Dames



In EMI's December 1996 issue, the Argentine wind instrument maker Ángel Sampedro del Río described his finely crafted bamboo saxophones. He follows here with three short articles on other bamboo winds, inspired by traditional Argentinean instruments as well as by the forms of nature.

THREE MORE FROM ÁNGEL

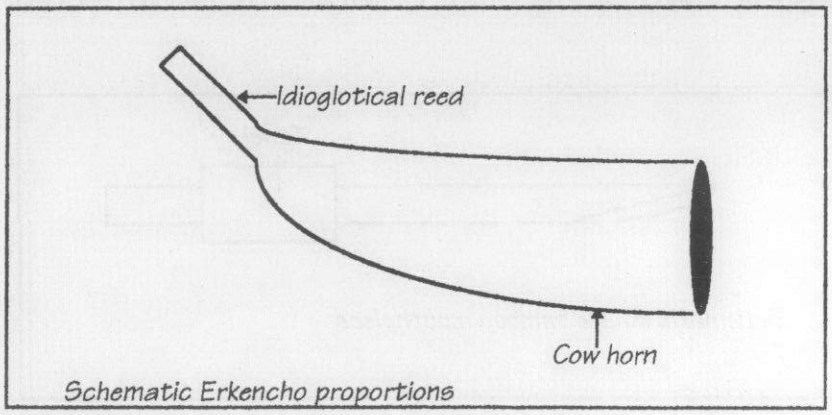
By Ángel Sampedro del Río

URBAN ADAPTATION OF ANCIENT CLARINETS IN ARGENTINA

For several years I have built (and I sell), among many other instruments, clarinets made of bamboo and other natural materials. Two sources contributed to the conception of these instruments:

One is traditional. There exists an Argentinean traditional musical instrument called *erkencho* (see diagram below). It consists of a little tube of cane (usually *Arundo donax*), a portion of which is partially split off to form an idioglotal reed, attached to a cow-horn bell. (Idioglottal reed = a reed which is of a piece with the instrument, not separate and held in place on the mouthpiece.)

Although the resulting sound is commonly attributed to the horn, that is not really the situation: It is the tongue that produces the original sound and the small tube that contributes to the frequency, while the horn mainly serves as a sound amplifier. The horn contributes little in the formation of the note that comes out. This instrument lacks toneholes to vary the notes; different pitches are obtained by modulating the reed through control of the embouchure. It is clearly a post-Hispanic instrument, but it has very much taken root in our more traditional folklore. It is the only authentic clarinet form (although primitive) from our country. Another visually similar instrument, but one that is actually a natural trumpet, is the called *erke*. It consists in a large piece of bamboo (two meters or more) attached to a cow horn.



Schematic Erkencho proportions

The other source for my bamboo clarinet designs is my work in the construction of bamboo saxes (as described in ***EMI*** Vol. 12 #2, Dec '96). For the bamboo saxes I use tubes of different diameters connected in series to create a "stepped cone" — that is, a series of progressively larger cylindrical bore sections recreating the acoustical effect of the saxophone's conical bore shape. As I developed this technique, it was natural for me to experiment with clarinet-like cylindrical-tube instruments as well.

There are two important differences between the acoustic behavior of clarinet-like cylindrical instruments and sax-like instruments using conical tubes (including "stepped conical" tubes): Cylindrical-tube wind instruments overblow the twelfth, while conical ones overblow the octave; and cylindrical tubes produce a fundamental tone approximately an octave below conical tubes of the same length. The conical tube will, in the ideal, resonate all the tones in the lower part of the harmonic series, while in cylindrical tubes the even-numbered harmonics are generally weak or absent.

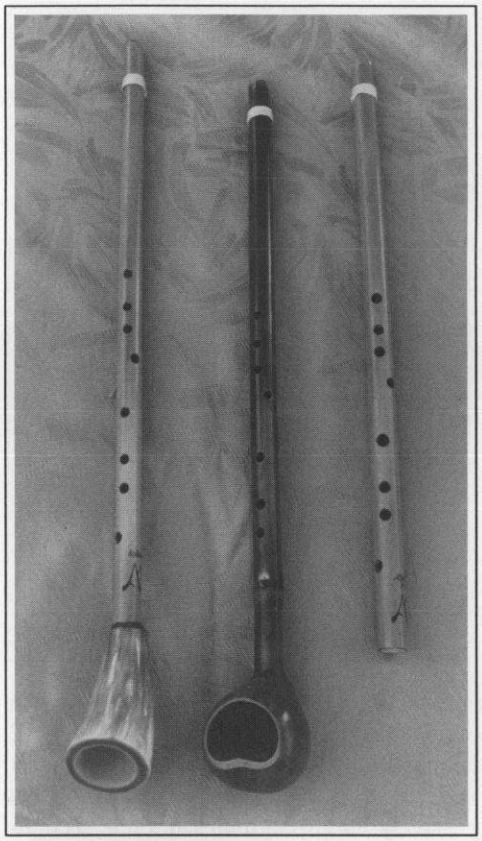
At that time (1985) I came up with many ineffective bamboo joints in my bamboo sax experiments, and these cylindrical tubes offered me the clarinet's characteristic hollow sound (an effect of the missing even harmonics) and an easy way to achieve deep frequencies with shorter tubes. [See upper photo, following page]

At first I regarded these "aidófonos" (as I baptized them) as a by-product of the sax production. But then I changed that focus, interpreting them as a projection of erkencho, the primitive Argentinean clarinet. Contributing to this change in my point of view was the fact that during those years in Argentina there was a great peak in the popularity of "nativista" music, also called folk projection.

The fundamental differences between the traditional erkencho and my aidófonos are:

- The enlargement of the bore, to provide strong and stable air column performance

Above: Ángel Sampedro del Río plays a B♭ bass Aidófono

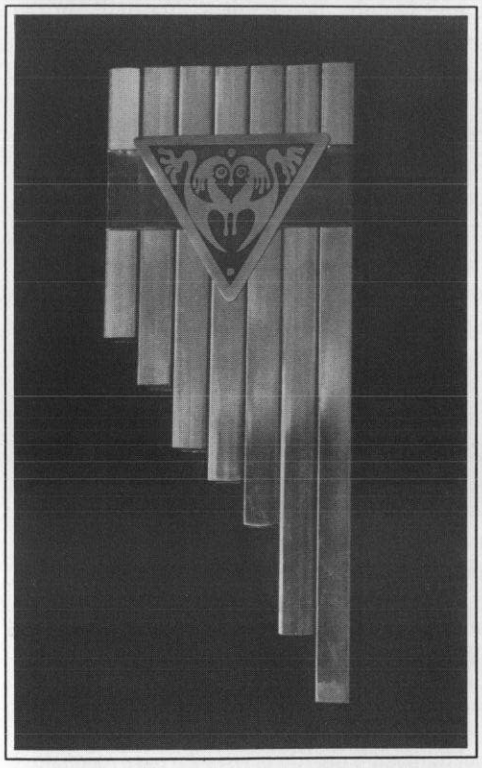


PHOTOS, THIS PAGE:

•Above: Aidófonos in F: one with a horn bell, one with a gourd bell, and one with no bell.
•Below: Square Bronze Antara

FACING PAGE, TOP TO BOTTOM:

•Double bamboo mouthpiece with flattened and cylindrical bamboos. •Double Pinkuyo with gourd.
•Bamboo for ocarinas (Phillostachis aurea).
•Bamboo ocarinas.



• Changing the traditional idioglotal reed for a conventional B*b* Clarinet reed, attached to a bamboo carved window.

• The addition of toneholes

• Making the horn bell smaller, to balance the loudness of the different notes. If I retain the traditional horn, the notes emitted when all the toneholes are closed are much louder than the rest. In addition to making the horn smaller I must add one or more additional venting holes to release acoustic pressure. The size of the toneholes (precisely, the ratio between the hole and the bore) is a key factor determining the loudness of a wind instrument, but it must be compromised with the playing comfort. The horn-venting toneholes system allows me to balance the whole loudness of the bamboo clarinet.

I discovered several characteristics of the instrument. Still choosing the diameters, inner bamboo shapes and reeds to use in a subtle manner, this clarinet type is more flexible in pitch and tone quality than a conventional clarinet. That grants it its own unique quality.

When I began to build the aidofónos I used larger diameter bamboo than now, ending in a knot where the embouchure was carved. That was covered by a tenor sax reed, in some cases glued to the mouthpiece. With this arrangement, the sound could be mistaken for that of a sax.[1] Later on I stylized the shape, using clarinet or soprano sax reeds. This allows a more controlled attack, but less total power.

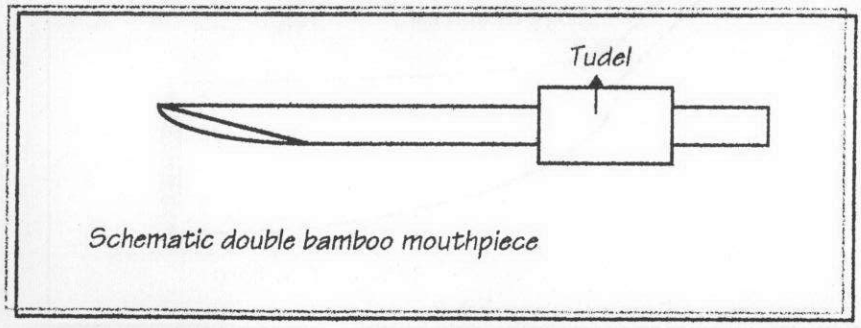
Another difference with this kind of tubes is the ineffectiveness of forked fingering to achieve semitones. One could cross-finger and at the same time adjust the intonation through lip pressure, but the best procedure is the half-holing, although this reduces the versatility of the instrument.

The temptation to make lower and lower pitched aidófonos was irresistible, arriving to Bb_1 with two or three keys, even though the very low-pitched instruments are difficult to control. Very high-pitched models, too, become difficult to control. For the high instruments the difficulty stems from the effect of the mouthpiece and reed setup on the air column. (Frequency biases of the mouthpiece and reed are more prone to dominate the smaller air column of the high-pitched instrument and throw off the resulting pitch).

Also I noticed that the clarinets are very sensitive to an eventual conicity (partly conical sections) that the bamboo bore can have. For this reason I very rarely use more than one piece for the body (the mouthpiece and bore are a single bamboo piece). But I have experimented with smooth conicities which offer strange and hard-to-predict responses, such as instruments which overblow an eleventh instead of a twelfth. In keeping with the harmonic-cooperation theory (the idea that the presence of harmonic overtones is important for stable tone in wind instruments), the resultant sound is unstable in the lowest register. But these clarinets have extraordinary high notes, with ranges up to three octaves.

WHAT ABOUT MOUTHPIECES?

In this game with the conicities I can't avoid mentioning something that happened me in bamboo saxophone construction. Traditionally I worked with normal cylindrical bamboo canes. I sanded off them to make the even surface where the reed is attached. At a certain point I began to work with mouthpieces with a flat surface. I had no luck by trying with mouthpieces with a flat wooden piece. Taking advantage from the natural shapes of a type of bamboo with a flat surface, I joined an inverse bamboo cone (with



Schematic double bamboo mouthpiece

a flat, and thus even surface) with a piece of cylindrical bamboo that I call the tudel, or back mouthpiece. [See photo at right and diagram on previous page] I have had great success with this kind of mouthpiece on the bamboo saxophones, but they are useless for clarinets. I think they add a sort of "conical influence."

In order to enhance the clarinet-like sound the best mouthpieces are the rounded bamboo ones.

OTHER ADAPTATIONS

What is better, a concert transverse flute or a bamboo *quena*? Following the standard western patterns, the answer is obvious. But it is also obvious that the quena (or any other non-mechanical flute) can do some things that are difficult or impossible for an standard flute. And it is obvious again that the reverse is also true.

What is the best quena? Following folk traditional patterns,[2] one that can play over a wide range, is easy to blow, can produce a major scale, etc. But somebody could make a quena which enhances the first octave with a particular timbre, taking into account that this fact might inhibit playability in the second and third octaves. And this quena could be the best in some circumstances.

As a curiosity, I also made flutes in non-traditional scales (Dorian, Arabic, etc.) in order to easily obtain unlikely modulations of given melodies. With these instruments the performer retains the traditional fingering, but obtains a different melody. These kinds of flutes are the best to learn some properties of scales. Each instrument favors the performance of a different kind of music, and the kinds of music are endless. I consider that something like this could be done with other kinds of musical instruments as well.

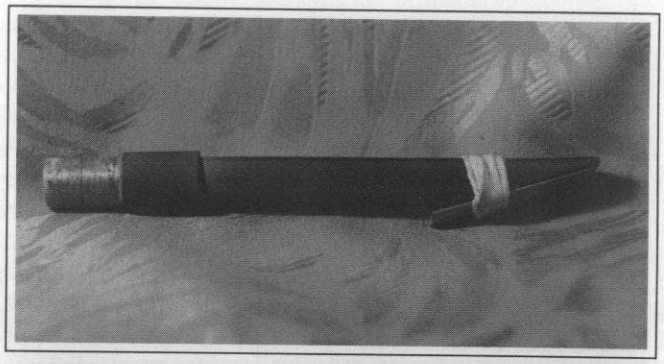
More than one South American instrument maker has built re-creations of traditional instruments. One of my own is the pentatonic Squared Bronze *Antara* (based on the antara panpipes, traditionally made of clay). The square form allows very fast passages. [See lower photo, previous page] Others are the Double and Triple Pinkuyos (also spelled *pincullo* and, in Bolivia, *pinkillo* or *pingollo*). The traditional pincullo is a duct flute of cane. In my recreations the multiple pipes, connected with a gourd, allow for chords and pedal effects.[3] [Second photo from top, this page]

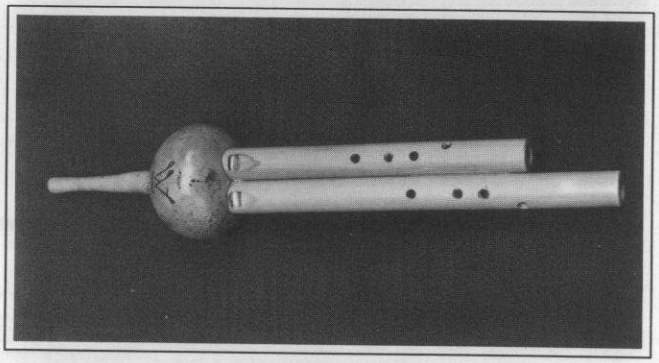
NATURAL OCARINAS

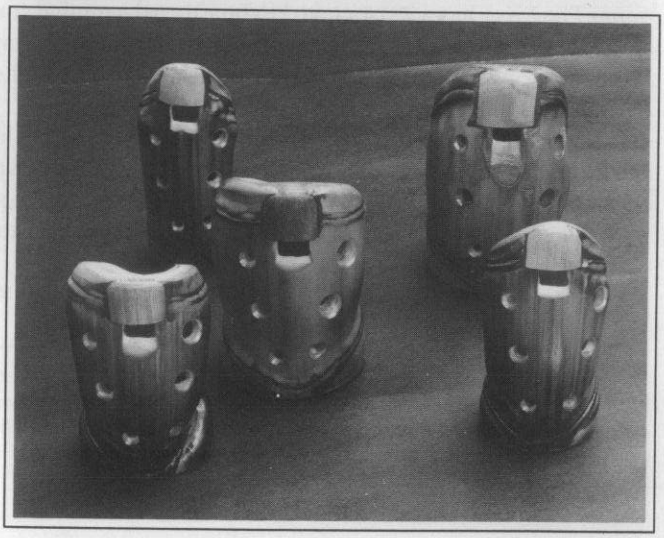
There are many ways to approach the construction of a musical instrument or a sound object. One of them is observation of natural ways, observing the call of natural objects to be music.

For some time I observed the knotted forms of a certain type of bamboo, and I thought about making of them a musical instrument with minimal alteration of their natural beauty. [Lower two photos, this page] And, as flutemaker, I thought in terms of a wind instrument.

The form obviously called to be an ocarina, but the biggest



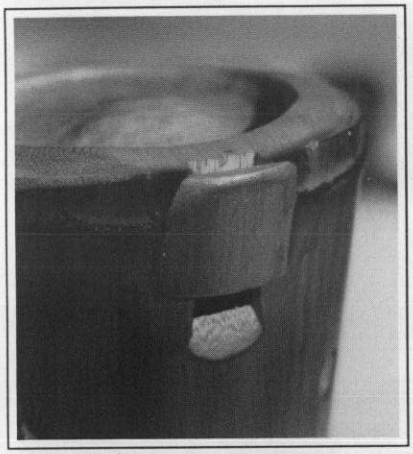




1. Following A. Benade's book *Horns, Strings and Harmony*, the cylindrical-bore woodwinds such as clarinets are less sensitive to the size and shape of the mouthpiece cavity than are the conical bore instruments. But undoutedly with some size relationships the harmonics that are typically missing in clarinets will appear, causing the clarinet to sound more like a saxophone.

2. When I say "folk traditional patterns" I refer to post-Hispanic Argentine music. The Inca time is another thing...

3. Traditional double pinkuyos can be founded in NW of Argentina and Bolivia, called "marimacho" literally "male and female."



Bamboo ocarina wind channel

challenge was to create the air channel, trying at the same time not to deform the natural aesthetics. I arrived at a solution with the help of the system used in the oriental duct flute called *suling*, which uses an external form of air channel. Although I don't apply the idea on my ocarinas in the same way it appears on the suling, the system is a very quick, practical and efficient way to introduce vibrating air into cavities or irregular tubes, without needing a plug, but only a cover. Besides, to make the channel one works to the "open sky" (i.e., during the construction process the channel is open and easily accessible from above), contrary to a flute. [See photo, this page]

The results have been good with these nice ocarinas whose tonality is determined by nature. Today I am a searcher for knotted cane specimens, as well as other natural materials similar to those that I transform into ocarinas, as horns, woods or tropical seeds.

Ángel Sampedro del Río is an Argentine instrument maker. He specializes in flutes, as well as clarinets (from $45 — including shipping) and saxophones made of bamboo and other natural materials, which he sells directly. Together with his wife Mariana they have developed a huge range of bamboo utility handicrafts. For any questions and comments, don't hesitate to contact with him at Scalabrini Ortíz 1960, Buenos Aires, Argentina; fax (international code +) 541-794-3880;

INSTRUMENTS

The SK-1 is a small and relatively affordable sampler keyboard* first put out by the Casio company around 1986. It was widely sold and became quite popular, and although it is no longer produced, many of the units are still around today. In the December 1996 issue of *EMI*, we ran an article from our regular contributor Reed Ghazala on how, by opening it up and creatively mis-wiring the innards, one can get wild and wonderful, unpredictable sounds from the SK-1 never intended by the manufacturer. Now, in the article that follows here, Walter Funk describes another trick for drawing unintended sounds from the SK-1, in this case without opening the housing and using only the existing external controls.

HOW TO SCRAMBLE YOUR CASIO SK-1 WITHOUT MODIFICATIONS

By Walter Funk

The SK-1 is in some aspects the earth's greatest sampler. It was many sampler players' first sampler and most people's only sampler. It's the sampler your next door neighbor's kids have. It was the first sampler sold at K-Mart.

This cute little device, like all instruments, has it's limitations. The SK-1 has a 2½-octave keyboard. All sampled sounds are placed at the *A* key in the middle of the keyboard. Playing above this keys plays the sample faster and therefore higher in pitch.

Playing below the middle *A* key plays back the sound slower and therefore lower in pitch. This gives the player a little over an octave in each direction relative to the pitch of the original sound. So you can "play a tune with any sound" but are limited to 2½ octaves.

There is a way around this limitation. There is a way to get pitches much lower than the lowest key on the keyboard would allow or pitches higher than the highest key allows. There must be some kind of catch, you might think. How would one control some thing like this? Well there is a catch. There are extreme audio side effects that occur — and that, really, is a plus.

The SK-1 can play either looped or non-looped samples. The looped samples work better when warping sounds.

Before I describe this process, we should examine the basic functions of the SK-1. There are five buttons on the control panel that relate directly to the samples. These buttons are labeled "Sampling," "Loop Set," "Portamento," "Envelope Select," and "Vibrato." Their functions are described below.

SAMPLING: When this is pressed, any sound played into the microphone or line in jack will be sampled for 1.4 seconds.

LOOP SET: Loops the sample. Press it once and the sample repeats itself; press it again and it plays a single time.

PORTAMENTO: Portamento effect. When on, the notes slide to each other. Press once to turn on; press again to turn off.

ENVELOPE: After pressing this button, you use the black keys

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* A sampler is an electronic device capable of recording a sound and storing it in digital format, available for ready manipulation and playback. In normal operation, with the SK-1 one can replicate the sampled sound at different pitch levels, using the keyboard in regular, piano-like fashion. A limited number of other manipulations of the sound are available as well.

to pick one of thirteen sound envelopes. Used to change the attack of the sound and for echo effects.

VIBRATO: Press once for vibrato on. Press again for vibrato off.

To start the warping process, you need to know the *combination of buttons* to press. The combination has no obvious relationship in regards to button function and result. All you need to start with is a good *sample that is looped*. Then pick a key to hold down. Now follow the combination below.

COMBINATION:

1) Press *vibrato* so vibrato is on.

2) Press and *hold down* a note on the keyboard.

3) While still holding down the note on the keyboard, press *Loop Set* twice.

Pressing Loop Set twice turns the loop off and then back on again. This keeps the sample looped. For some reason when this is done in vibrato mode while holding down notes on the keyboard, something strange happens. The sample plays back at a really slow or really fast pitch. As the loop continues, the sample gets slower and slower or faster and faster until it reaches the normal pitch of the key. It seems semi-random which direction the warp moves in, from above pitch to normal or from below. Moving around on the keyboard will change the direction.

When the sound moves from down to up, it is more interesting. When starting from below the key pitch, the process lasts longer and the effect varies greatly with different samples. When the sound starts out faster, it is over quickly and the effect varies less with different samples. They each have their place.

Depending on what key you press you get different results. The further away your key is from where the warp starts, the longer it will take to get to that key. When the sound warps from below, the highest key takes the longest to reach normal pitch and vice versa, the warp from up to down last longest with the lowest key.

The SK-1 is a four-voice polyphonic sampler (that is, it's capable of producing up to four tones simultaneously). All four voices can be used in this warp trick, and if they are not all used in the process, remaining voices can be played normally. *Portamento* also works in warp mode when some normal voices are used with warping. The notes will glide from the stretched to normal note, much farther than usual!

Try warping keys next to and distant from each other (tape or weights on the keys help). Of course, use many sounds. Rhythmic sounds work very differently than sustained sounds. Bells and glass are some of my personal favorites.

Walter Funk created the HOLOGLYPHIC FUNKALIZER, *a 3-D image/sound performance environment. Live Hologram-like electronic animations are performed in time to live music. Walter performs and records with Fifty-Foot Hose, Mandible Chatter, and Fred "Spaceman" Long.*

MICROPIANO-IZMO

toy piano mutation

Conceptualized by zHANg

"If you're going to explore uncharted territory,
it's okay to carry a compass, but not a map."
— *Derek Bailey*

Playing an invented instrument has the tactical (and, perhaps, "tactile") liberating power of possessing little or no pre-conceived musical methodology or history.

Playing such an instrument outside of "idiomatic" musical traditions or styles (i.e. rock, rap, folk, world beat, new age, classical, jazz, etc.) can be more truly "radical" and "alternative" than what these over-used words mean in modern musical life(styles).

"Improvisation is the basis of learning to play a musical instrument. It has to be realized that a person's own investigations of an instrument — his exploration of it — are totally valid."
— *John Stevens*

For me, playing non-idiomatic improvisational music is more interesting in many ways — and on many levels — than any "conventional" music. In non-idiomatic improvisation, it is a given that one does not think, move, react or behave like anyone else on Earth, that one's thoughts/actions are as unique as fingerprints. In some hands, Free Improv can be quite self-indulgent — conversely, the best Free Improvisers are terrific listeners, extremely alert to others and intensely aware of the world flowing around them, especially the soundscape(s) surrounding them.[1]

"Music is a herald, for change is inscribed in noise faster than it transforms society . . . Listening to music is listening to all noise, realizing that its appropriation and control is a reflection of power, that is essentially political."
— *Jacques Attali*

Being an improviser interested in live-electronics and percussion, I am more attracted to texture/timbre, noise, indeterminacy, and "purposeless play"[2] than to melody/harmony, tone/pitch, tradition/composition and "high art" seriousness.

Being "economically endangered," I have — for several years — been exploring solutions to the problem of creating a variety of electro-acoustic sounds without expensive HiTech consumerism or being encumbered with an overly complicated "jury-rigged" kit of over-extended proportions.

A year ago the solution to this dilemma struck me [pardon the pun] while listening to a CD: *John Cage: Works for Piano, Toy Piano & Prepared Piano; Vol. III.* (Joshua Pierce, piano & toy piano; Maro Ajemian, piano; Marilyn Crispell & Joe Kubera, toy pianos. Edition John Cage, Wergo, 1991, WER 6158-2.) Why not create an amplified, prepared toy piano — portable, affordable, uniquely individualistic and full of wide-ranging possibilities for musical sound and noise?

The prepared piano, as the idea was developed by John Cage, is a piano "systematically perverted" by placing or inserting pieces of metal, rubber, plastic, wood, etc., between the strings to alter the tonality and timbre. In essence, this heightens and multiplies the percussive qualities of the piano — one can create a microtonal *and* non-pitched palette of pings, buzzes, and gong- and log drum-like sounds.

John Cage described the prepared piano as percussion orchestra under the control of a single player (the prepared piano also has been called "a poor man's percussion ensemble"). Many have compared the prepared piano's sounds to that of rhythmic Indonesian *gamelan* and to the sparse-but-noisy, time-suspending percussion of Asian ritual music. One apparently conservative but witty critic called the prepared piano an "ill-tempered clavichord."

What I have always liked about John Cage's prepared piano pieces are that they were partly inspired by and are highly evocative of Asian gong-chime music without ripping it off wholesale in some type of culturally imperialistic pastiche.[3]

Naturally, my problem with a prepared piano is its expense and size. Also I find it more challenging and attractive to create an "improvising musical vocabulary" from spare, limited means: "less can be more than adequate."

John Cage is also credited as being the first contemporary composer to have composed "seriously" for the toy piano, with his solo *Suite for Toy Piano* (1948). What may have started off as a neo-Dadaistic gesture has become a viable alternative to conventional keyboard instrumentation.

Since that time many other composers have used toy pianos in compositions. A few pop and rock musicians have used toy pianos — but mainly as an oddball sound effect. (Also, a few have utilized prepared pianos.) I must state that Steve Beresford, an improviser,

1. For me, this is a form of "applied Taoism."

2. This was one of John Cage's definitions of "music" influenced by Zen & Dada.

3. My ever-radical father, a Cantonese industrial designer-architect/artist/poet, born in Indonesia and raised in British-occupied Malaysia, encourages me to "expand on" Asian music rather than 'Mickey Mouse' it like every other Tom, Dick and Harry."

plays toy pianos frequently enough to warrant mention under "Toy Piano" in *Groves Dictionary of Musical Instruments*.

Despite their limitations and, frequently, unfortunate "cheapness" of quality, toy pianos should be re-examined from the viewpoint of their similarities to other musical instruments.

Usually limited to somewhat off-key, vaguely imprecise ranges of two chromatic octaves or three diatonic octaves, the toy piano is a small keyboard instrument with a mechanism that is similar to that of the full-sized keyboard glockenspiel. Similar in some regards to the glockenspiel, the toy piano operates in this fashion: upon striking a key, a small felt, plastic or hard rubber hammer — attached at the rear of the key — hits a metal plate or rod that is fixed at one end to the resonating part of the instrument's body. The toy piano is also distantly related to popular mid-19th century "parlor music" instruments like the nail violin and to the numerous instruments constructed around tuning-forks.

For a full discussion of both the construction and the history of toy pianos, see Margaret Leng Tan's excellent article "Toy Pianos No Longer Toys!" in this issue of *Experimental Musical Instruments*.

Up to the mid-20th century, toy pianos were mainly in the style of "upright" pianos with 15 to 22 white keys. Some larger, higher quality models have as many as 30 keys, including functional black keys. In recent decades, cheaply made imported toy pianos from China, Japan and Germany — mainly styled after "grand pianos" and limited to having only 15 to 20 white keys — have entered the market, as well as some very well made imported instruments. There are also the even more limited "toy pianos," like the high-quality, impact resistant plastic models made for toddlers by Fisher-Price as well as the many imported "bargain basement" models with as few as five keys (and few, if any, redeeming qualities — musical or otherwise — in a world of dwindling natural resources).

In 1960, John Cage composed one of his most influential "live-electronic," indeterminate works — *Music for Amplified Toy Pianos*. Composed for an unspecified number of toy pianos amplified with contact microphones as well as various percussion and toy noise-makers, the score consists of eight transparencies with a graphic notation of points, circles and dots-within-circles. The performers superimpose the transparencies in any manner they like and play from these visual cues that will never be exactly the same twice.

For me, the real inspiration is in the use of contact microphones to bring out and heighten the colorful "small sounds" latent in the toy piano — the struck metal rods or plates, the toy piano mechanism itself, any accidental or deliberate performer "actions" — create a surprising variety of timbres and textures. Besides, the unamplified, unprepared toy piano sound is, for me, "inadequate."

It is sometimes taken for granted that the amplification of incredibly small sounds is one of the earliest and most basic methods of live-electronic music. Electronically amplified "micro-sounds" open up extremely rich kaleidophonic microcosms of normally inaudible sound texture and timbral color.

In the 1960s, John Cage's pioneering use of contact microphones in live-electronic music made way for new instrumental possibilities and means to explore an almost infinite number of small timbral/textural microcosms.

Since 1960, countless other composers, instrument-builders and improvisers have followed in Cage's wake: Chris Brown, Richard Lerman, Hugh Davies, and Tom Nunn — to name just a few that come to my mind — have all created many different types of instruments (and pieces of music) based on the amplification of micro-sounds using various kinds of contact microphones.

Contact microphones are not like other microphones which pickup and amplify air pressure or sound waves. Contact mics only act upon the *direct* vibrations of resonant surfaces. Contact mics are piezo-electric transducers that produce an electrical signal when mechanical stress — the direct vibrations of the body of a musical instrument or sound-making object — is applied to specific kinds of crystals and special ceramic materials.

Contact mics are commercially available at most music instrument stores. One of the best known brand-names (since the early 1970s) is Barcus-Berry, with a range of contact mics for virtually every type of conventional musical instrument. A more recent contact mic, known as K&K, is also available (and, in my humble opinion, more-than-excellent and reasonably priced). One can also make "home-brew" contact mics out of piezo-electric elements available through most bargain/surplus electronic supply outlets and mail-order catalogs.

At the present date (2/19/98), I have not created an amplified prepared toy piano yet since I have not found a suitable toy piano. Despite this "obstacle," I have dubbed this "amplified prepared toy piano" concept the MicroPiano-izmo. Preparations will probably include different kinds of small coil springs, nuts-&-bolts, tiny metallic rods and wires, etc., attached to the various rods or plates. Adding a neo-Cagean element of randomness:

- a pair of ten-sided role-playing game dice and a large, brown seed will be allowed to jitter around inside the MicroPiano-izmo (somewhat like Lalo Schifrin's use of golf balls in a piano for the soundtrack of *Hell in the Pacific*)

- a metal-wire and magnet kinetic sculpture (looks like an imitation Taki artpiece), screwed into the top of the MicroPiano-izmo, will shake and vibrate adding very faint, periodic metallic pinging and shimmering sounds

Acting like a *combinatoire* — a device for generating unforeseen combinations from a fixed repertoire — the MicroPiano-izmo, most importantly, will solve the problem of how to create distinctive sounds.

Without resorting to outrageous HiTech music instrument consumerism, I will put the theoretical values of "Appropriate Technology" ("Small is Beautiful") into action.

In avoiding the burden of an extravagant, mammoth percussion kit, I will ironically — and inadvertently — abandon (and, perhaps, go beyond) standard percussion instrumentation by reducing percussion to its "essentials." Because of the MicroPiano-izmo idea, I have found other sound-making toys to use in future improvisational work.

Like the article you are reading right now, the MicroPiano-izmo will also be a homage to John Cage (1912 -1992). I wish to give credit, respect and thanks to everyone mentioned or quoted in this article. I also gratefully acknowledge the continuing friendship and support given me by *EMI* editor Bart Hopkin, instrument-builder/circuit-bender Reed Ghazala, and instrument-builder/improviser Tom Nunn. In addition, I must publicly thank my sister's piano teacher, Dr. Norma "Doc Auch" Auchter, for lending me all her John Cage books and recordings and for taking me to a John Cage concert/lecture about a decade and a half ago.

"Art is self-alteration." — *John Cage*

Ironically, toy pianos are no longer available in most mass-market toy stores. A store manager of a certain nationally known toy store chain told me that the popularity of electronic keyboard toys has "all but wiped out the existence of toy pianos."

Expensive specialty toy stores are more likely to stock one or more toy pianos (if at all), or they might be willing to special order one for you if you are willing to pay a small-but-sizable percentage of their month's profit [and I am certainly not willing to — even if I could afford to].

Toy pianos can be found in thrift, import, and antique stores, but a search for a cheap-but-decent, modifiable one may take some time. (I have not been able to obtain one as of yet — anyone who might be helpful in this regard should write to me in care of Bart Hopkin, editor of this magazine).

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zHANg (readable/pronounceable: "Han Zhang," "Zhang Han," &/or "Zhang") has written for EMI before under his birth-name "Jonathan Chang" ("Hunting Down A New Sound," Vol. 10, #4, June 1995).

THE ICELANDIC LITHOPHONE

by Elias Davidsson

A unique combination of geological and meteorological factors have contributed to the formation of stones that produce clear musical pitches when hit or struck. Such stones, although quite rare, have been found in as widely located countries as China, Venezuela, Togo and Iceland. After a short historical and geographical review of this unusual instrument, the recently discovered and developed Icelandic Lithophone and its musical application will be described.

HISTORICAL AND GEOGRAPHICAL REVIEW

Ringing stones are called *lithophones*. Lithophones have been known since antiquity in China, Korea, Samoa and Vietnam. They have been found in more primitive forms in black Africa (north of Togo and northern Nigeria), Central America and in a few locations in Europe such as Greece, Sardinia, the Swiss Alps and England.

The oldest known lithophones are from Vietnam. They were discovered by Georges Condominas in 1949 in Annam. They are now stored at the Musée de l'homme in Paris and were described and discussed in several scholarly articles, including the authoritative article by A. Schaeffner in *Revue de musicologie*, XXXIIIe année, July 1951: "Une importante découverte archéologique: le lithophone de Ndut lieng krak." These ten ancient Vietnamese lithophones were clearly tuned by flaking, reportedly a technique of stone-age man, and yield two sonorous pentatonic scales. Their size is impressive: From 65 cm. to 100 cm. in length, from 10 to 15 cm. in width and up to 6 cm. thick. They weigh between 5 and 11 kg. each.[1] Other lithophones from the neolithic period are stored in the Horniman Museum, London.[2]

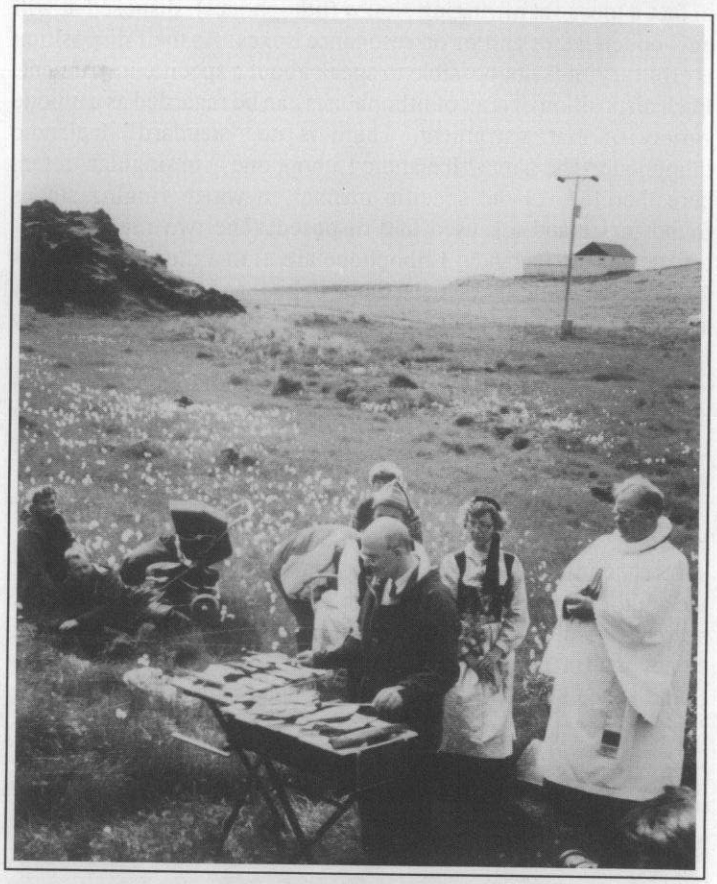
Stone chimes (*ch'ing* or *qing*) are among the most ancient and valued instruments of the Chinese. These *L*-shaped stone slabs are suspended in a large frame and struck on their long side with wooden mallets or padded sticks. They are a tuned instrument.

Sonorous stones can be found in various places around the world. In Ethiopia, stone chimes are used as church bells in certain places. In the Kabre region of northern Togo every family has its own lithophone, usually played by the young boys. J.H. Kwabena Nketia describes these in his book *The Music of Africa*:

"The shape and size of the stones vary considerably. In the Kabre region of northern Togo, the instrument consists of four or five flat stones that are arranged in star formation on the ground or on a bed of straw. The musician hits them with two stone strikers; the striker that is held in the right hand usually plays the tune, while the other punctuates the musical phrases or taps out the rhythm on the largest stone, which has the deepest or most neutral sound."

"Giant lithophones exist in Northern Nigeria, chiefly in the regions of Kano and Jos. These lithophones are composed mostly of groups of rocks that have been found in natural formation. The music they produce is still used in some villages for initiation and circumcision ceremonies or for certain religious ceremonies. As in northern Togo, there is a similar relationship between the lithophone and farming..."

"In Kusarha, near northern Cameroon, the lithophone is used as a means of communication with the spirits whose voices can be heard echoing from the caverns in the rocks."[3]



Elias playing on the Icelandic Lithophone at an outdoor wedding at Maria's Well, located in the Snaefells Peninsula in Iceland, probably in summer 1989. At the right: the late Rev. Rögnvaldur Finnbogason.

Some of the most remarkable lithophones in existence are to be found in the English Lake District. A set of sixteen musical stones embracing two diatonic octaves and one note is in the Fitz Park Museum, Keswick. These stones were discovered in 1785 in the bed of the river Greta and on the nearby mountain of Skiddaw. In the same museum is kept a 'rock harmonica' invented and developed by Messrs Richardson and Sons from rocks dug out of Skiddaw. This instrument comprises five chromatic octaves of stone slabs measuring 15 to 93 cm. in length. The slabs lie over a soundbox and are insulated at the nodal points on ropes of straw. It is reported that Mr. Richardson played classical music on his instrument.[4]

THE STORY OF THE "ICELANDIC LITHOPHONE"

The instrument referred here to as "Icelandic Lithophone" is in fact a loose set of ringing stones (lithophones), disposed at will on wooden lathes and/or on resonance boxes. As their disposition is arbitrary, it is not possible to speak about a specific instrument. Each disposition of a set of lithophones can be regarded as a unique variety of that instrument. There is no "standard" Icelandic lithophone. The name "Icelandic Lithophone," in singular, refers here therefore to the specific manner in which ringing stones found in Iceland are used and disposed. The two main characteristics of the Icelandic Lithophone are a) that the stones are not tampered with (neither chiseled nor flaked) and thus do not follow a prescribed scale or system, and b) that their quantity and variety permits their use for real musical performance.

Jón Leifs is probably the first Icelandic composer who introduced stones into his compositions. His use of stones was however limited to the provision of a special percussive effect in an orchestral setting.

In the summer of 1982 this author discovered during an excursion at the Whale Fjord, an hour's drive from Reykjavik, several sonorous stones of various pitch. This discovery spurred the author to undertake systematic searches for such stones. Such searches resulted in the collection of over one hundred ringing stones with a range of almost three octaves. Most stones were found in the Reykjavik area, some in the Snaefell peninsula.

Elias Davidsson and maestro Antonio D. Corveiras, professor of organ at Oviedo Conservatory and director of the Oviedo International Organ Festival, who invited Davidsson to participate with him in a joint organ-lithophones concert in November 1996. The concert included works and improvisations for solo lithophones and ensemble playing, solo organ works and a specially composed piece for organ and lithophones. In front of A.D. Corveiras, a special resonating box designed by Davidsson to amplify the sound of deeper lithophones. For each stone a special compartment is allocated, the bottom of which can be raised and lowered at will. In addition the player can adjust the locations where the dead points (nodes) of the stones rest on the box. The box is ornamented with old Icelandic runes saying "Icelandic Lithophone." On the side are two large stones resting on a couple of wooden lathes.

The Icelandic Lithophone was publicly introduced for the first time at the Nordic House in Reykjavik in the autumn of 1982. Dr. Orthulf Prunner and the author improvised on two sets of lithophones while two brothers, Haukur and Hörður, showed mobile body art after having been painted by Myriam Bat Yosef. This unusual event was reported with illustrations in the weekly magazine *Vikan*.

Since then, numerous opportunities presented themselves for public performance on lithophones. In most cases the music was improvised, sometimes by the author alone, sometimes with one, two or three additional performers. The improvisations always took place in the framework of another event: In the intermission of a trade unions' conference, for the opening of an exhibition, in a religious service (Lutheran Mass), in a secular wedding ceremony or as an item of a varied cultural program.

The author has since then presented the Icelandic Lithophone at various locations in Germany and Switzerland. On November 29 1996 the author was invited to present the instrument in the framework of an International Organ Festival at Oviedo, Spain. The program alternated between works for organ and the Icelandic Lithophone. For this occasion, the author composed and notated two works, a short prelude for Icelandic Lithophones and "Unequal Dance" for organ and Icelandic Lithophone, the latter work being dedicated to the author's friend and organizer of the festival, Antonio D. Corveiras, who performed this work brilliantly.[5] The concert included a solo improvisation by the author as well as an improvisation with the participation of Mr. Corveiras and one of his pupils, Emilio Huerta, on Icelandic Lithophones.

DESCRIPTION

Most Icelandic Lithophones are basaltic, isotropic stones which, as a result of climatic changes, have split into thin slices or slabs. The stones range from 15 to 50 cm. in length, and 6 to 15 mm. in thickness. They widely differ in their form although most are oblong. They yield a great diversity in timbre and pitch. The surface of most stones is rugged.

In order to sound clearly, each stone should ideally rest only on its two nodal points (located about one quarter from each end of the stone). The author has found that the most effective manner for placing these stones is either transversally on two parallel wooden lathes covered with isolation strips or above a specially conceived resonating box, but isolated through pads on which the nodal points rest. The last method is only effective for low-pitched stones. The author has developed two types of resonating boxes, an elaborate one[6] designed for six stones and a simple one for single stones. To make the lithophones sound, they are either hit or stroked. After many experiments, the author found that small, rather hard, mallets (such as Balter no. 5) or elongated pebbles, are the most effective to produce a clearly pitched sound. The sound is strong and incisive, it carries a great distance but is of extremely short duration. A continuous 'tenuto' sound can however be obtained by stroking the rugged surface of the stone with another stone or pebble. Depending on the consistency, the mass of the stroking pebble and the pressure applied, various sound colors can be obtained.

The pitch of the Icelandic lithophones — as found until today — appears to range across three octaves from written A (110 Hz) up to written b" flat (around 900 Hz). Their real

pitch lies in fact one or two octaves higher than written (it's a little hard to distinguish which octave the tone is falling in), a phenomenon similar to that of the xylophone. The stones show a diversity of timbre, from a wooden-like tone to a clearly metallic tone.

The fundamental note of a lithophone stone can be perceived with most clarity when hit at its extremities. By hitting the stones at other locations overtones, mostly inharmonic, can be obtained. It is also possible to enhance the fundamental note by using softer mallets. Some stones provide two or three simultaneous pitches. The dynamic range of Icelandic Lithophones is quite impressive, from a very soft pianississimo to an appreciable forte. Even the softest sounds are clearly perceived.

As the Icelandic Lithophones are not tuned to any scale but played as they are, and as they vary in substance and timbre, they are not suited for playing tonal music. The author has not developed until now any standardized placement of the lithophones. The number of stones and their physical disposition can change from performance to performance. For performances the stones are placed loosely on wooden lathes (duly isolated) and on resonating boxes. But for informal or home use, they sometimes are just placed on a carpet, outside on the lawn.

MUSICAL USE

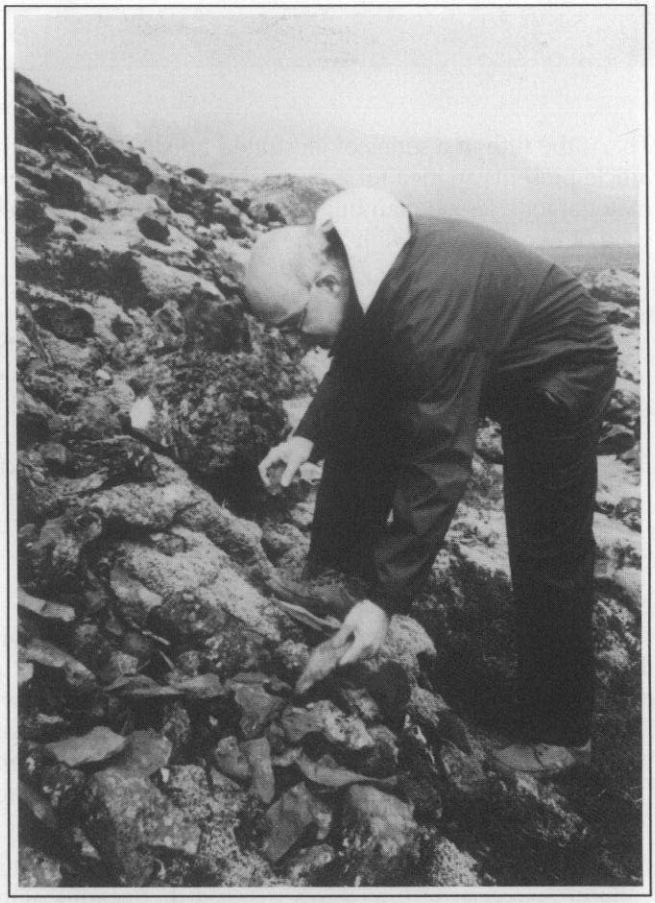
Playing the Icelandic Lithophone does not require musical training, only a keen and attentive ear. The author has observed small children enjoying playing for long stretches of time on Icelandic Lithophones.

After introducing to five junior college students with no musical background some basic playing and improvisation techniques for about half an hour, these youngsters were left to their own devices for two hours. Subsequently they performed for their friends and for this author two highly successful collective improvisations, each of them using a set of 8-10 stones.

In the hands of a sensitive musician, a set of Icelandic Lithophones can become an instrument of great expressive quality. It is ideally suited for solo or group improvisations.

As the Icelandic Lithophone is not a standardized instrument — each stone being unique in form, pitch and timbre — and as they are not tuned to any particular scale, notation for this instrument is problematic. As yet no ideal solution has been found to this problem.

Playing the Icelandic Lithophone in its natural surrounding, where the stones are found, can be an unforgettable experience. The Icelandic Lithophone played in closed or semi-closed built areas can bring life into a drab city neighborhood. To stroke the rugged surfaces various stones can also be an intimate, reflective, meditative, even therapeutic experience. When approached with respect, each stone reveals a unique personality. Sometimes an occult power seems to emanate from the stones, as if they were carrying a message from bygone times and attempting to address our deepest roots.



Elias Davidsson searching for good lithophones at the Snaefells Peninsula, Iceland, 1989.

NOTES

1. Heinrich Husmann: "Das neuentdeckte Steinzeitlithophon," *Musikforschung* 1952 (Nr. 5, S. 47-).

2. *The New Grove Dictionary of Music and Musicians*, Macmillan Publishers Ltd, 1980 (under Lithophone)

3. J. H. Kwabena Nketia: *The Music of Africa*, Victor Gollancz Ltd. London, 1986

4. The *New Grove*, ibid. For more on lithophones from the English Lake District, see also "The Till Family Rock Band" in *Experimental Musical Instruments* Volume VII #5, April 1992.***

5. "Unequal Dance" for Icelandic Lithophone (xylophone) (ISBN 9979-889-28-4). It is about eight minutes long and presents a challenge for the organist. It can be obtained from the author for $10 including postage.

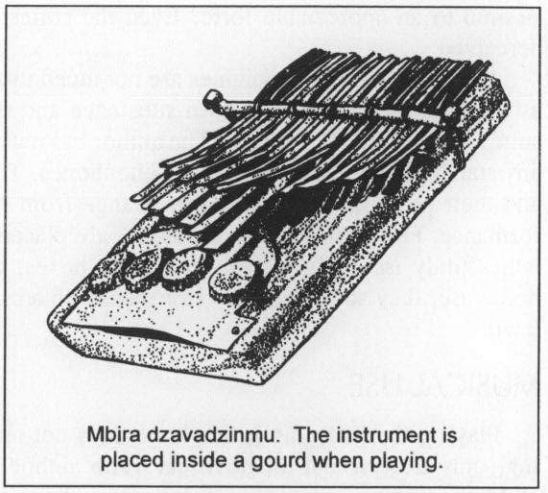
6. For each stone a separate compartment is allocated, the bottom of which can be lowered or lifted to ensure optimal volume of air. To allow for the varying size of the stones, the position of the resting pads can also be adjusted.

Elias Davidsson was born in Palestine in 1941 but has lived in Iceland since 1962. He has composed since childhood and studied piano and composition. Among his published works figure prominently collections of short pieces for children (piano, strings, woodwinds), which are used world-wide by the teaching profession. Mr. Davidsson divides his time between composition and human rights activities. He can be reached at Post Box 1760 - 121 Reykjavik - Iceland; phone (354)-552-6444; fax: (354)-552-6579; email: edavid@itn.is; URL: http://www.nyherji.is/~edavid.

This is the fifth in a series of illustrated articles from Robin Goodfellow now appearing in *Experimental Musical Instruments*. Each article presents an idea for a musical instrument simple enough to be made by children. In addition, each article contains the raw material for a lesson plan built around the instrument, including rudimentary principles of sound, elements of cultural lore, and a song or two. With this fifth in the series, Robin presents ideas for kalimba-like plucked-prong instruments.

MELLOW LAMELLAPHONES

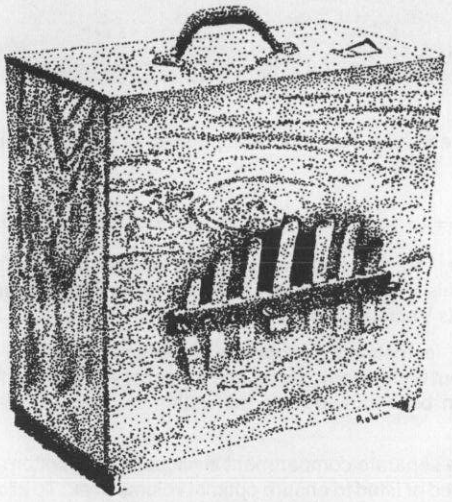
Article and illustrations by Robin Goodfellow



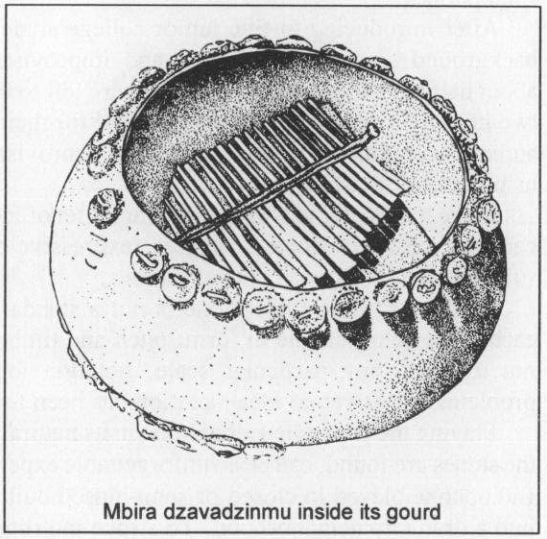
Mbira dzavadzinmu. The instrument is placed inside a gourd when playing.

"Plunk your magic twanger, Froggie!"

In the kids' show from the forties and fifties, Andy Divine had only to say these words and his froggie friend "plunked his twanger" and disappeared in a puff of smoke. Nobody remembers actually seeing this powerful instrument, but the message is clear: a twang sound activated by a plunk is something to be reckoned with!

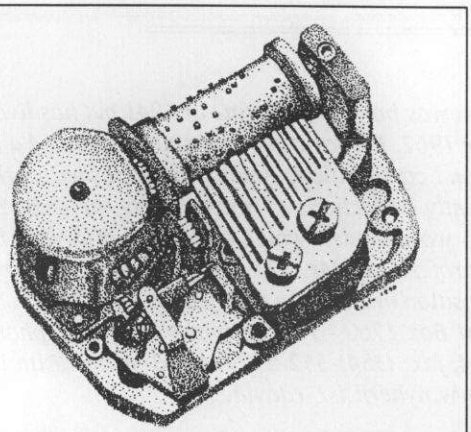


Jamaican rumba box



Mbira dzavadzinmu inside its gourd

While California children were giggling at Andy's disappearing amphibian, nearly half a world away in Zimbabwe, a group of Shona people were engaged in a twanging ceremony that was definitely not for children. Highly trained men were "plunking" with both thumbs and a couple of fingers from their right hand on "twangers" carefully tuned and hidden behind great calabash spheres that amplified the sweet, complex, contrapuntal rhythms of songs passed down to them from generations of *mbira* players. The task of these sophisticated musicians was to find the song most pleasing to a particular ancestor who was being summoned to assist in some immediate problem of the town. These *mbira* players had been hired and a medium had been contracted through whom the ancestor would speak if he so chose.



This music box is closely related to the comb instruments described in this article.

Solo or with a partner and a *hosho*, or rattle player, the master worked through a repertoire of songs, adding tasteful variations in the hope that one of his pieces would send the medium into a trance that would allow people to ask the questions that were most pressing and receive, through the medium, help from trusted ancestors. Sometimes they sang with the instruments, sometimes the people danced, and several people played *hoshos*, waiting for the magic from the music to work.

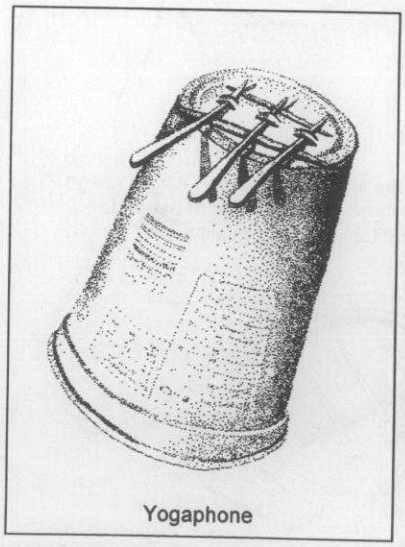
The *mbira* (the word is both singular and plural) used in such ceremonies were sometimes as old as the ancestors. Others were new and made by the musicians themselves or by a local blacksmith who forged the iron for the keys, creating the distinctive *mbira* tone. Although many Shona people play *mbira* for recreation and companionship, the *mbira* used in the ancestor or *bira* ceremonies are treated in a very different manner. They must not be carried visibly on the street, for some harm might come to the instrument, or the player might be asked to play, and it would be improper

for a ceremonial instrument to be seen being played on the street. The master *mbira* player Hakurotwi Mude commented scornfully about *mbira* playing in another part of the country. "Can it make you feel sad? Can it make you think deeply? No, it is for playing in the beer halls." [p.134, *Soul of Mbira*]

Mbira-type instruments are found in many parts of Africa. There are hundreds of names for the different types found in large and small geographical areas. The styles of playing and the social importance given to the instrument varies as does the type of material, number and quality of keys and method of amplifying the sound through the use or non-use of a resonator. Skilled *mbira* players generally started studying as young children and were tutored by members of their family. If the child showed great promise he might be allowed to study with a master. The music was learned orally, sometimes with the teacher pointing to the keys to be played. Teaching was an unpredictable profession, however, and some teachers were as likely to hide fingering secrets from their students as guide them. Playing the *mbira* well enough to play in the *bira* ceremonies brought a child great status, allowed him an opportunity to earn money for his family and gave him the right to participate in an activity that other children were barred from.

Most of us will never have the experience of playing the *mbira huru dzavadzinmu*, the "great *mbira* of the ancestors" with such skill that our "fingers have eyes" for playing without watching our hands. We will not know this great intimacy between master and instrument. But *mbira* playing might not be permanently out of our reach. Most music stores and many local craft fairs carry *mbiras*, *kalimbas* and related instruments. Some of them, while being expensive, do vibrate pleasantly in the hands and make gentle, mystical music. They are excellent instruments for children to learn to play by ear or by reading music. They lend themselves to improvisation and blending with other instruments. If you get one for your child, get one for yourself as well and play together! If you want to explore the acoustical properties of lamellaphones, as these instruments are called, without the expense, and alas, also without the rich sonority and magical qualities, it can be done in a much more modest manner. The results may be pleasant, if not divine.

A lamellaphone is an instrument constructed in such a way as to cause a strip, or tongue, of stiff, springy material to be held under tension and plucked to initiate vibrations. The instrument will sound with more vigor if it is connected to a resonator of some sort. The keys have been traditionally made from everything from iron, copper, steel and brass to pieces of bamboo, nails, umbrella staves and bicycle spokes. These materials are not universally easy to obtain, easy to work with or found in abundance in an urban setting. Experimenting with the lamellaphone principles can be accomplished, however, with simpler materials, safer tools and more modest tonal expectations.

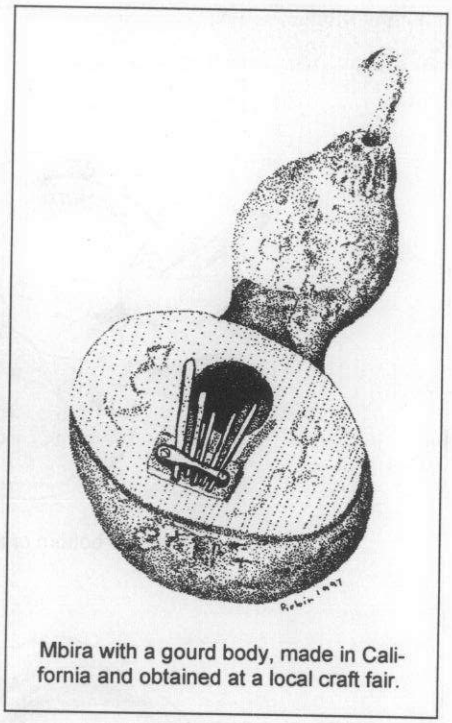


Yogaphone

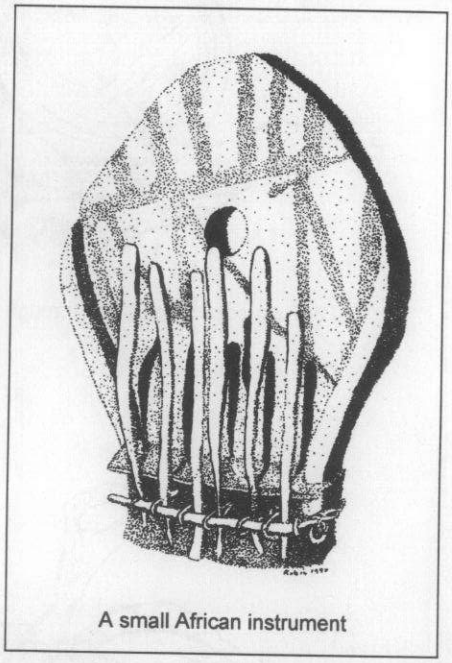
To make a Yogaphone:

One lamellaphone I have discovered and made with students is based on a large yogurt carton, three sandwich picks and two round toothpicks. The operational tool here is an exacto knife, so use your judgment working with kids. I do the cutting myself for most of my students. My adults handled the knives just fine.

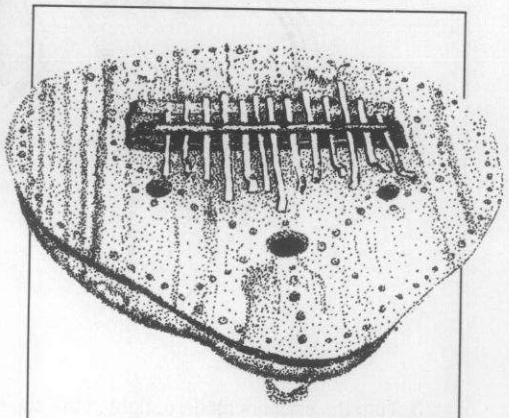
The operation is thus: Select a large (32 oz. or 2 lb) yogurt carton and turn it upside down. Make three sets of parallel cuts about a quarter inch apart near one side of the bottom circle. (See diagrams, next page.) Stick the small ends of three sandwich picks (large toothpicks available in most grocery stores) through the cuts. If this is difficult, slide the blade of a small pair of scissors into the slot, twist it gently to make an opening and slide the pick in the space. Remove the blade and push the pick further in. Force one round toothpick under the sticks to give them a slight bend. Now pull the picks forward so that they extend past the edge of the carton. Pluck. If the sound is good, fine. If not, force the other small round toothpick under this large, forward end of the picks and pluck the ends. Adjust the length to modify the pitch and timbre (tone quality). If you don't get a do, re, mi, take whatever sounds good and improvise with it! Usually some sort of *um pa pa* will emerge and can be added to sung or played songs.



Mbira with a gourd body, made in California and obtained at a local craft fair.

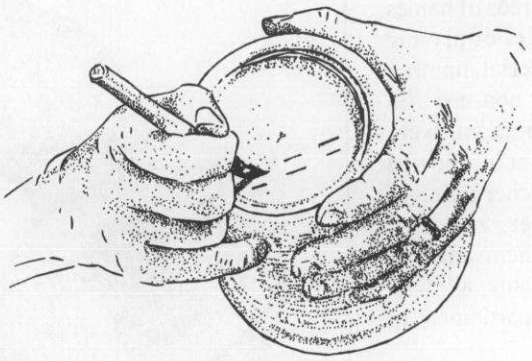


A small African instrument



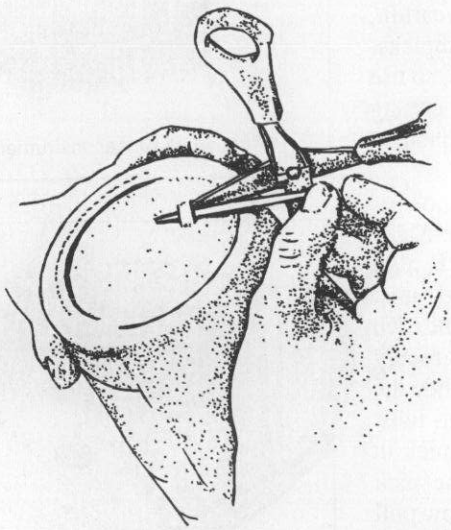
An African instrument of unknown origin

MAKING THE YOGAPHONE

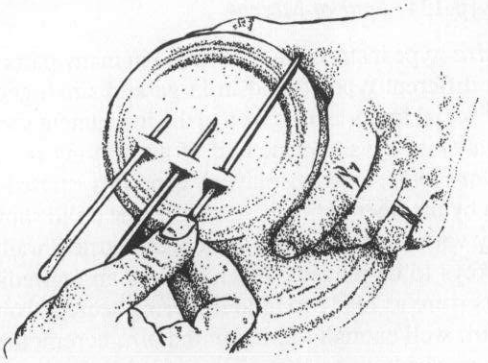


1. Cutting the slits in the bottom of the yogurt carton.

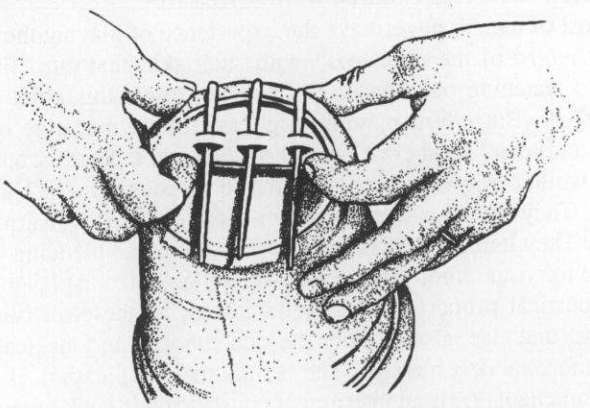
2. Push scissors part way through slit to open it up.



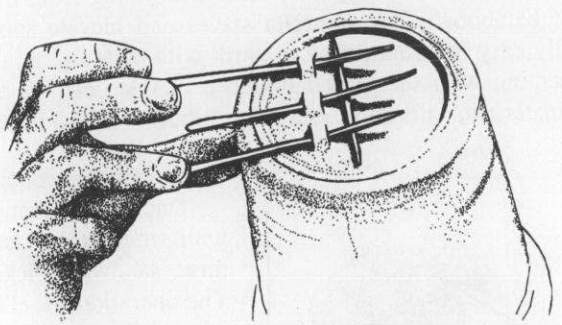
3. Turn ths scissors blade upright in the slit, making a space in which to slide the sandwich pick, small end first. Do this in each slit.



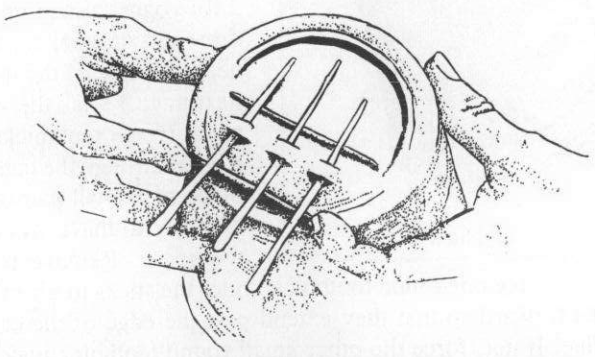
4. Push the picks through so that the small end sticks out farthest



5. Turn carton around and force a regular-sized, *round* toothpick underneath the three sandwich picks.



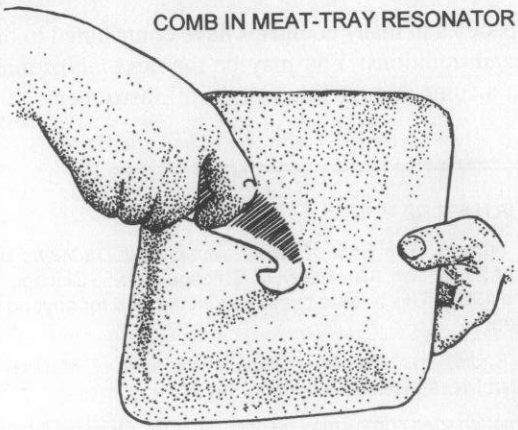
6. Force the round pick under the sanwich picks as far as it will go. Pull the picks out until they extend past the edge of the carton. Pluck, testing the pitch and tone quality.



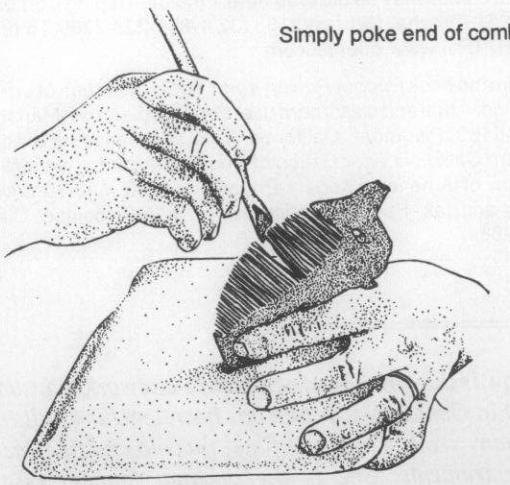
7. If the tone is not good, force another round pick under the front, or other side of the picks. This is called the bridge. Some yogurt cartons bottoms form an adequate bridge naturally; some do not.

Another lamellaphone-type instrument in which a tongue, or in this case "teeth," are set to vibrating is a variation on the Robert Louis Stevenson poem, "Take a comb and play upon it, marching , here we come!" The original was probably a piece of paper folded over the comb. By placing the lips upon it and humming, a mirliton, or kazoo effect, was performed. What I suggest is more closely related to a music box. If you take a comb and run your thumb across it, a very tiny, pleasant sound may emerge. If you add a resonator to this instrument, the sound can be quite surprising. Combs with thin, flexible teeth are preferred to combs with thick, stiff ones. The best I have found for this purpose are children's animal-shaped combs. They come in several animal shapes, which produce teeth of varying lengths. The sound of a thumb stroking the tummy of a dolphin or Dachshund is delicate and very musical.

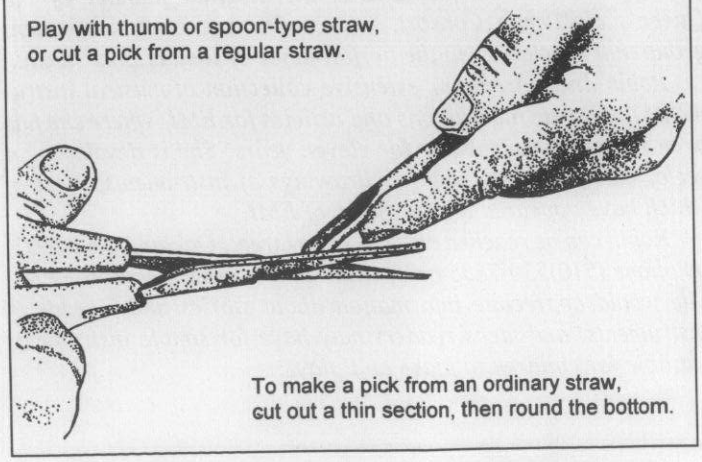
COMB IN MEAT-TRAY RESONATOR



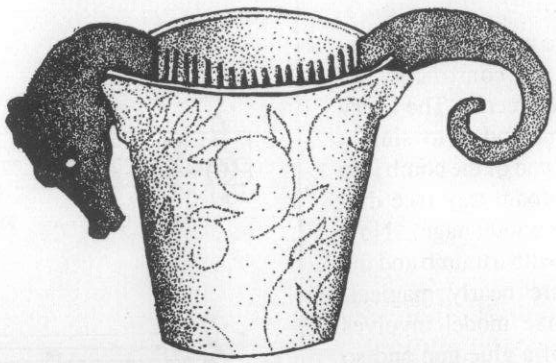
Simply poke end of comb into tray.



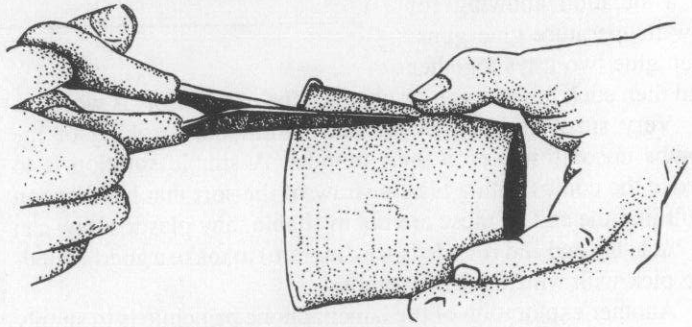
Play with thumb or spoon-type straw, or cut a pick from a regular straw.



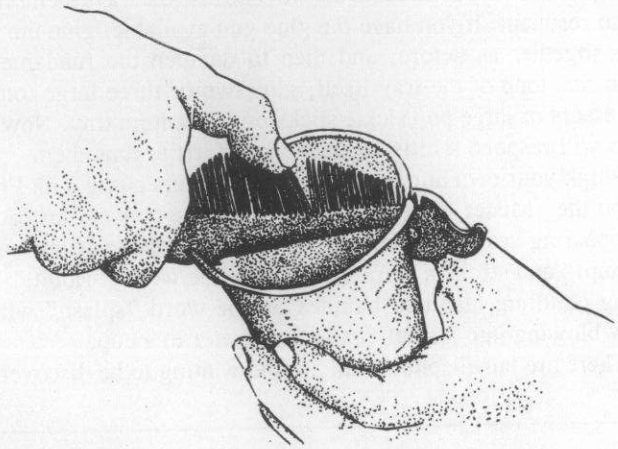
To make a pick from an ordinary straw, cut out a thin section, then round the bottom.



COMB-IN-A-YOGURT-CUP LAMELLAPHONE



1. Cut a slit in one side of a small yogurt cup. If desired, cover cup with deocrated paper.



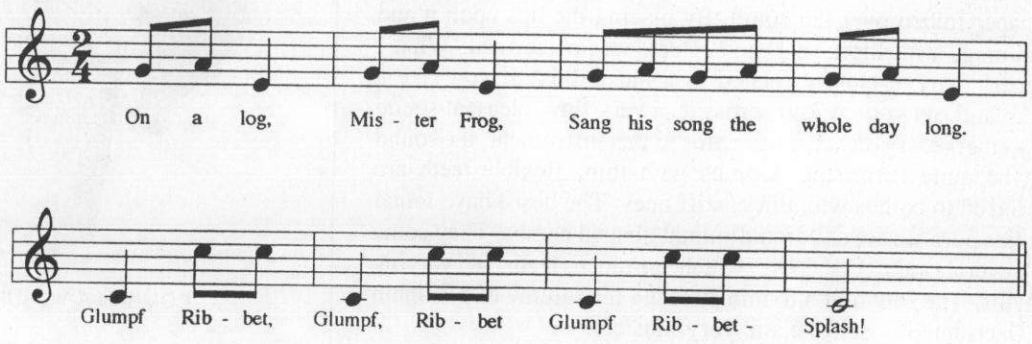
2. Push the solid side of the comb firmly into the slits. Stroke the teeth gently to play.

There are two ways I have discovered to amplify this sound. One is to take a small yogurt cup and make two slits with scissors a couple of inches deep on either side of the top edge, dividing the space in half so that the slits are opposite each other in the middle of the carton. Force the back of the comb (or tummy in the case of the seahorse) into the slits and again stroke the teeth with a thumb. For best results, stroke from the smallest to the largest teeth. The degree of amplification is surprising. The ultimate resonator I have found so far, however, is a double meat tray. Again, as I mentioned in my "Plicker Plucker" article (*EMI* June, 1998 pp 24-27), it is no longer safe to recycle meat trays because of possible salmonella contamination. They are quite inexpensive in quantities from restaurant supply companies. A local butcher might possibly be persuaded to part with a couple of new ones for the purpose of

musically educating the young.

There are two levels possible in the construction of this instrument. The very simple method is to simply poke the end of the comb into the styrofoam tray (see diagram, previous page). Now stroke it with a thumb and the results are nearly magical. The deluxe model involves the use of a glue gun and so might not be suitable for many applications. If you are in a situation allowing for low temperature glue guns, then glue two trays together and then stick in the comb or combs. The extra effort is worth it.

Mister Frog

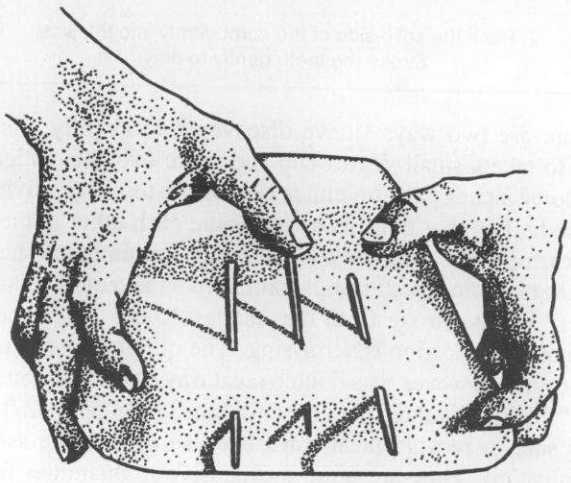


Very small children might find continuous stroking of the combs uncomfortable on their thumbs. A simple solution is to stroke the combs with a plastic straw of the sort that has a spoon built into the end. If these are not available, any plastic straw can be cut at the end and rounded (see diagram) to make a good-sounding pick with which to play combs.

Another exploration of the lamellaphone principle is to simply poke about three sandwich picks across the bottom curve of a tray. The result might not be quite what you would expect. The pitch of the picks is very difficult to control because the trays themselves are so resonant. If you have the glue gun available, glue the two trays together as before, and then to dampen the fundamental resonance tone of the tray itself, glue two or three large tongue depressors or large pop sickle sticks on the bottom tray. Now the picks will respond a little bit better to efforts to tune them.

Plunk your own homemade magic twangers along with Froggie on the "Mister Frog" song (see the score above). Instead of disappearing in a puff of smoke, play the Yogaphone on the words "glumpf" and stroke a comb quickly for the words "ribbit." For young children, also add bubbles on the word "splash" with a straw blowing into a small amount of water in a cup.

There are lamellaphones all around waiting to be discovered. Many peoples in many countries have contributed to their design, music and traditions. You may be the next *mbira* maker, player or even a composer for this wonderful instrument.



Very simple lamellaphone: picks through styrofoam tray

FOR FURTHER READING:

Paul F. Berliner: *The Soul of Mbira: Music and Traditions of the Shona People of Zimbabwe* (University of Chicago Press, Chicago and London 1981 and 1993). This book is highly recommended for anyone interested in the subject.

Stanley Sadie, ed.: *The New Grove Dictionary of Musical Instruments* (MacMillan Press Limited, London 1984).

The animal-shaped combs may be ordered from: Oriental Trading Company 4206 South 108th St. Omaha, Nebraska, 68137 1-800-228-2269 To order a catalog on line:HTTP:// www.oriental.com

"Mister Frog" is from the book *Puppet Power*, a wonderful collection of animal songs suitable for individual and classroom use. Order copies from Marianne Benson, 510-654-6489, Piedmont, California. This book was prepared by and for the Northern California Association of Kodaly Educators, an affiliate of the Organization of American Kodaly Educators 1998. $12.50 covers postage, handling and tax. For information about NCAKE contact Diane Doron (415) 567-2689.

Robin Goodfellow is the director of Mandala Fluteworks, a studio of music and art in Oakland, CA. She has been teaching children and adults for many years, and plays flute, piccolo and tin whistle among other instruments. She is the original founder of the Queen's Ha'Penny Consort, a recorder and early instrument group that specializes in the performance of Renaissance music.

Robin draws from her extensive collection of musical instruments to provide illustrations and articles for EMI, where she has been a regular contributor for eleven years. She is developing a set of notecards featuring her drawings of instruments, most of which have appeared on the pages of EMI.

Robin can be reached at 1655 Vista Street, Oakland CA 94602, by phone (510)530-7835 or by email at robingoodfellow@earthling.net. *She would appreciate information about stories and legends of instruments, and ideas readers may have for simple instruments suitable for children to make and play.*

BROWSING MY MIND

or

Dwinstruments I Have Known

by Dwin Craig

EIGHT BAR INTRO.....

Retired and single again (outlived one and outran the other) I now do what, where, when, how I want with my time and my money.

Drill press, band saw and 8-foot workbench live alongside computers, book shelf and stereo system in my living room ... where else ? Blowtorch, dremel and soldering stuff live in the kitchen ... near water.

Engineer, inventor, entrepreneur, marketeer, promoter and explainer of my name are a few job descriptions of my 78-year career. Now, a tiny slice of my time is invested in making Dwinstruments and sometimes writing about it, like now.

PS: Dwin is not short for anything — it is long for DW!

MEGAPHONE ..... Now Hear This !

I never lose a sock in the dryer. Sometimes I find an extra one. To date I have found four extra ones. None of them match. Hmmmph

While in the laundry room, I spotted a thing which reminded me of Rudy Vallee, the old-time crooner, who used a megaphone (before electricity?) to amplify his singing.

An empty liquid detergent jug quickly became a megaphone after cutting out the bottom and pulling out the pouring spout. With a ready-made handle, it works and also can be used as an ear trumpet. A pair of them and two folks could speak to each other over an acoustic walkie talkie system.

A big boon to the electronically challenged crowd.

Speaking of speaking, read on.

MR. SPEAKER ..... May I Have The Floor?

I have a few dynamic microphones and lots of speakers. Both have permanent magnets, a coil and a diaphragm. In normal operation, the mike is a generator which converts motion into electricity. Conversely, the loudspeaker is a motor which turns electricity into motion.

It turns out that both can be either. Suddenly, I have microphones all over the house.*

One is a 2" Radio shack speaker mounted on a 6" piece of plywood with a 1/4" socket at one end. Everything is held in place with plumbers epoxy.

With the help of a little Velcro, I have attached this guy to a cello, acoustic guitar and soundboard of an upright piano. In every case the output level and frequency response was great. Try it, you might like it.

Attached to a cigar box containing macaroni, with different grades of sandpaper on top, it made a wild rhythm section with thumping, scratching, etc. with just the fingers. No sticks. Tap fingernails on the magnet side of the speaker and you get clavès. Attached to knee (Velcro, you know) gives a foot-stomping beat. Feed it to a second input of the guitar player's power amp and you have a drum set you can carry in one hand.

A wild thing.

A row of these bad boys mounted on a length of plywood can be connected electrically in series and mounted (Velcro again) on the sound board of any acoustic piano. A grand piano can sound even grander with the big boys mounted at the bass end and the little folk at the tinkling end.

What a concept!

HOWLERS ..... Wouldn't You?

It is easy to make a gorilla howl without stepping on its tail (they don't have one). The Gorilla is the brand name of a powered speaker into which I plug various microphone candidates. These range from 2" speakers up to 6" oval auto speakers, boom box speakers and even the big stereo cabinet guys with mounted woofers, mid range and tweeters.

All of them howl when they see the Gorilla.** Wouldn't you?

As you can imagine, the big ones have excellent low frequency response and all howl at frequencies depending on how close to

---

*Here's how a speaker can function as a microphone: the air movement of the sound causes the speaker diaphragm to move, and with it the coil at its center. This induces an alternating voltage in the coil as it moves relative to the speaker's fixed magnet, and just as with a microphone, this signal can be sent to an amplifier. Alternatively, the speaker can be attached directly to a vibrating body; in this case, it is inertia that causes the coil to move relative to the magnet, with the same result. — ed

**Placing the speakers near the Gorilla's own speaker creates a feedback loop, as the air movement of the Gorilla's output excites the nearby speakers, which, acting like microphones as described above, send the signal back to the Gorilla. This gives rise to the howling sound associated with microphone feedback. — ed

the Gorilla they venture. Moving to and fro takes us through harmonics. You node that, didn't you?

To my surprise, a 2-inch piezoelectric tweeter from Radio Shack gave a super output level and made the Gorilla screech with pain. It's a great mike but has almost no low-frequency response. I suspect they are used in bull horns.

Wow. Have I got microphones galore !

ASCII PICS ..... Type a Diagram

The computer keyboard has a lot of funny symbols which send coded messages recognized around the world. ASCII is a jazzed up Morse code which means something like American Standard Code International Interchange. Thank the Lord for Acronyms.

Look around the keyboard and you find ^ v < > for up, down, left and right.

We find [and] for drawing boxes containing microphones, like [M].

There are also + and - for indicating polarity of batteries etc.

A battery might be -{6}+ in circuit like

```
>>>>>v
     v       ^>>>>>>>>[amp]
     v       ^
     v>>>>>>^
```

You get the idea.

Fancy fonts and proportional spacing can mess things up, but ASCII is a regular guy. It's a miracle, if you ASCII me.

Not only would such diagrams be useful for remote communication (I'm trying it on the Internet); it might be handy for doing magazine articles, being simpler for generating and producing a diagram. Letters to the editor are more likely to be printed and also convey how clever we are. All of us can use a little credibility.

My Amiga computer is very clever and with luck you will see how clever both of us are, somewhere in this article.

Roll 'em.

OUT MITTA NOYS ..... Cancel the Garbage

A couple of 2" speakers mounted about 6" apart on a piece of plywood suddenly becomes a red hot noise canceling microphone when cross-coupled.

The arrangement looks like this:

```
   / < + {M} - >\
  ^             ^
  A             B
  v             v
   \ < - {M} + >/
```

Output is taken from points A and B. When both microphones {M} receive the same sound there is no output. When the thing is held vertically, distant sounds arrive at same amplitude and phase and produce no output. On the other hand, when one of the M is held close to the mouth, the voice output is big since sound at the further M drops as the square of the distance.

A switch in one of the M lines is great for demonstrating the difference between noise cancel and not. Before-and-After (Fat and Thin) comparisons are very impressive.

Several years ago I recorded Before-and-After output under a number of different conditions.

Standing six feet from a band saw, I could not hear myself speak. The recorded tape played the band saw with no me. Switching, I came through loud and clear while the band saw disappeared. Impressive.

In an empty warehouse with cinder-block walls the echo when I spoke reverbed for about a half second. Throwing the switch, it suddenly became a soundproof recording room.

Standing in front of a huge PA system, the howl was intolerable until I threw the switch. Cranked up the volume to max and still no howl. I hope the rap guys don't hear about this.

Talking to either M gets through, making it a good man-on-the-street interview mike or for vocal duets. No outside traffic noise, no inside ventilator sounds. No sounds from the band for vocals. Give the mixing guy a break.

HOWLING ORGAN ..... Wolf Call of the Wild

Controlling the howl can be useful. A bunch of 2" speakers (25 of them) will give two octaves when all can see a single powered speaker. The little speakers, each at a different distance will howl at a different frequency. A switch in each will allow you to play this organ. The switch should be a spring-loaded contact. The organ can play only one note at a time. That's the way with howlers. That's also the way with brass and woodwinds. So, give it a go.

I might.

MIXER BLENDER ..... Light Work Makes Many?

I built a mixer using light (IR) to do the job. The box has 8 RCA sockets for line-level audio inputs. Each one drives an IR emitting diode (LED). They are aimed at a pair of IR phototransisters. The whole thing is powered by a 9-volt battery. Circuitry is on the back of the Radio Shack cards where I bought the parts. Output from the two phototransitors are also RCA sockets intended to feed a stereo system.

With the lid off (ambient light does not affect the IR sensors) I pointed a couple of TV remote controls into the box and listened to the mixed coded output. Each button on the control makes a different sound and some of them are almost musical.

To join the game, start with a matched IR emitter and phototransistor detector from Radio Shack, Stock No.276-142 $1.99. Circuit diagram is on back of the card. Later you can buy more IR emitters and detectors separately, as your project grows.

This raises the thought that a whole group of musical instruments could be easily mixed if each had a microphone and an IR transmitter. No wires, no mike stands or any of the usual impediments. We already know where to get good, cheap microphones ... don't we? Also no feedback. Wow!

PHONE-O-GRAPH .....
A Picture Is Worth A Thousand, etc.

Somehow, it seems that a phonograph should involve sound and pictures. A current project is to make that happen. I just bought a $25 record player from the local hock shop and am

planning to install some optronics so that I can listen to pictures spinning on the turntable. The plan is to hang an IR light-emitting diode and an IR phototransistor on the tone arm. The tone arm will be held in a fixed position and not allowed to spiral in. The output will then be repetitive for a given position of the arm and will provide a rhythm, a prime requisite for any kind of music.

At 33 rpm, one "lump" will give 33 beats per minute while two lumps at opposite sides will give 66 bpm. A triangle of lumps will give 99 bpm. A piece of white tape makes an optical lump, giving an audible thump.

Switch to 45 rpm and the beat goes up. You get the idea.

At first I plan to stick whatever is handy on a piece of cardboard, just to hear what happens. Later, I will go to patterns generated on the computer.

Prelim calculations tell me that if the optics can resolve twelve black and white bars per inch on an eight-inch circle, the maximum frequency out will be 144 cycles/second(Hz), at $33^{1}/_{3}$ rpm.

Not a bad starting point, but plenty of room for improvement.

Research and Development is just a jazzy name for Trial and Error.

A centerfold photograph from *Hustler* mag may sound pornographic on the Phone-O-Graph. Stay tuned.

JUICYBONE ..... A Trom By Any Other Name

Fit a whistle to a tube (no holes) and stick into a bottle, jug or can of water. Move the container up and down and play all possible notes in three octaves.

Wobble the jug for tremolo (frequency shifts).

For show, I use an old fashioned coke bottle. For more show, a whistle attached to a drinking straw can be used with a can or tall paper cup.

For practical reasons, a 2-foot whistle tube immersed in a larger-diameter 2-foot tube (PVC to the rescue) takes less water and gives a longer stroke.

Be sure to close off the bottom of the big tube. You knew that.

Is it a bird? Is it a trombone ? No, it's a JuicyBone!! Fanfare Please.

DRYBONE ..... Hold the Juice !

Same idea as JuicyBone without the juice. Start with two tubes in concentric juxtaposition (patent talk?), leave the ends open and fit a saxophone mouthpiece to the smaller tube. A pair of PVC tubes leaves enough space to run a narrow strip of Velcro (the furry part) down the outside of the inner tube. This gets rid of wobble and, more important, provides an air seal which slides easily. A ½" ID tube inside of a ¾" ID tube gives enough space for a long strip of velcro and makes a good-enough seal.

Tube lengths of about two feet make a good stretch. For effect, add some kind of bell to the outer tube at any angle you choose. Rotating the tube lets you point the sound.

DryBone can be played anywhere in any position except face down in the bath tub. Don't try that at home.

PEGBORED ..... Magic Holes

Ordinarily, I am bored with pegboard and view it as a place to hang a lot of stuff from hooks. But wait! Now I am charmed by all of those equally spaced holes available in large board sizes and different thicknesses.

Why? Because I suddenly hear music coming from these things (with the right stuff, of course). Holes in the Masonite are great for attaching things and let me design stringed instruments to fit the hole placements.

Give the drill a rest.

Read ON!

WARP SPEED ..... Beam Me Up

Here we use a big, thin hunk of Masonite to make a single-stringed plucker-thing.

A 1 foot by 6 foot by 1/8" thick section is something that can be played standing up and still fit in the car.

Now, attach steel picture-hanging wire to opposite vertical ends of the board with enough tension to warp the board about 6 inches at the middle.

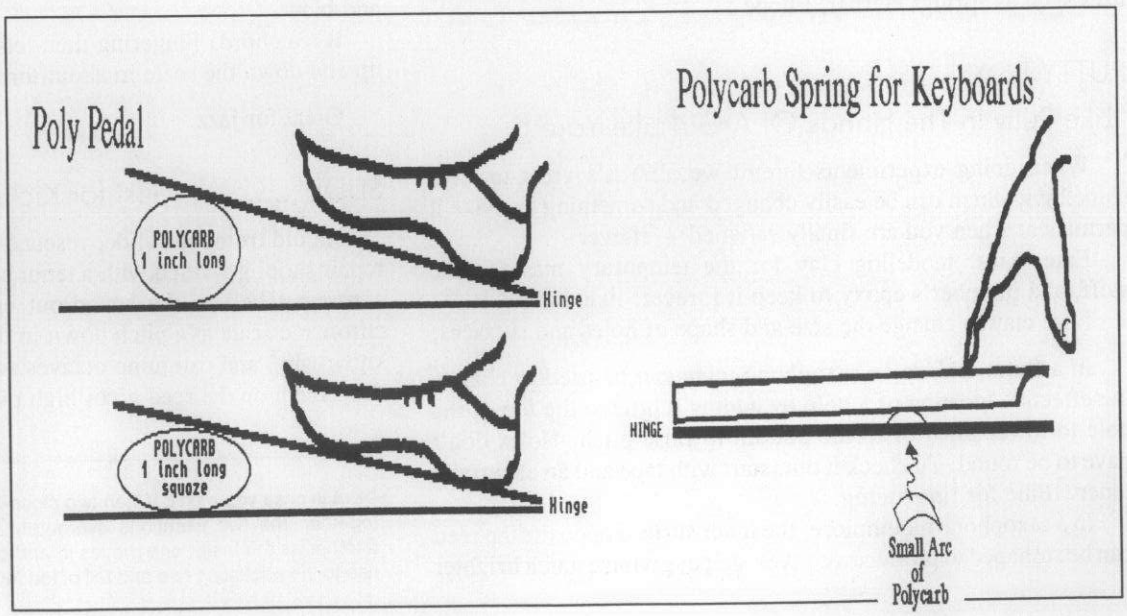
A bow with no arrows.

A turnbuckle might be useful for tuning the thing.

For overkill, add a second string of a different gauge (pounds/1000 feet) and tune the pair of strings to your favorite two-note chord.

Space the strings about 2" for double plucking (is that a musical term?)

"To play is the thing." Pluck and do nothing and you get the fundamental pitch. No surprise! But now we go to a moving fret which may be the fingernail or a guitar pick. Lightly applied,it changes the length of the string. A heavy-handed jiggle gives a tremolo or slow bend.



Flexing the board with a knee changes pitch and makes you stronger.

The board has enough surface to be a good sounding board to be heard without amplification. If not, grab a small loudspeaker and attach it (bolts, glue or Velcro) along with a 1/4" socket.

You know the rest !

SPRING HOPES ETERNAL ..... Or visa verso ?

In the "Letters" section of *EMI* Vol. 13 #4 (June 1998) I described polycarbonate tubes for protecting fluorescent light bulbs. The properties of this stuff, about 2" diameter, suggest a few other useful uses (as opposed to useless uses) such as springs and tube couplers. A 1" length of tubing can be squeezed down to an oval and snaps back immediately. A great compression spring for foot pedals [see figure below]. Beat that drum!

For smaller applications, cut into parallel strips about 1/2" wide, you get keyboard springs [second figure below]. To make momentary electrical contacts the strips are great.

Samuel Morse would have loved this stuff.

Next, cut parallel to the axis through one wall of a 2" section. It immediately pops into a coil about 1" diameter. Twist to get the size you want. Great for coupling tubes of different sizes. A bead of glue under the overlap and you have a stiff, airtight coupler.

A long length of coiled stuff can become a "blow into" thing which is squeezable, to change pitch, or when cemented to your desired diameter can be drilled for holes. Maybe a soldering iron would make holes which could be easily shaped for tuning.

Slit the entire 4-foot length and watch it coil. Slip one end into a saxophone mouthpiece and a beer can or peanut butter jar into the other, depending on how much flare we want in this cone. Slip a bead of glue under the overlapped edge and give it time to hold.

Then remove the thing from the big end and blow.

Squeeze up and down to get pitches to make music. Start with "Twinkle Twinkle" and work your way up to Beethoven's 5th (slightly less than a quart).

Look out,Carnegie Hall !

Polycarbonate means many carbon atoms. It also means many uses such as springs eternal, I hope !

PUTTY POXY .....

"Like Putty In The Hands Of A Girl Like You"

When doing experiments (aren't we all?) it's great to have something which can be easily changed and something to make it permanent when you are finally satisfied — if ever.

Enter kids' modeling clay for the temporary massageable stuff, and plumber's epoxy to keep it forever, like diamonds.

I use clay to change the size and shape of holes and surfaces.

In a flute, whistle or saxophone, clay can be used to change the effective location of a hole by adding a little to the top of the hole to lower pitch or to the bottom to raise pitch. Holes don't have to be round. To check it out, start with tape and an electronic tuner. Fine for fine tuning.

In a saxophone mouthpiece, the inner surface opposite the reed can be reshaped to produce a convex shape, giving a much brighter tone. Massage the clay to try different shapes and, when happy, the clay can be left or replaced by epoxy.

The same claymation action can reshape trumpet and trombone mouthpieces.

I don't know of any way to reshape the embochure (chops).

Too bad!

SQUEEZE ME .....

But Please Don't Tease Me (Ellington)

Also in the *EMI* "Letters" section, I described how a 2"-diameter tube of polycarbonate, 4 ft. long, could be played by making a motorboat sound with your mouth at one end. The surprise came when squeezing the tube at different positions changed the pitch, allowing me to play a chromatic scale and even some tunes after a little practice.

In search of other squeezable tubes, I discovered the drinking straw.

With a penny whistle mouthpiece on one end and the opposite end closed off with a plug of modelling clay, I can do the same thing. With two hands (thumb and forefinger) I can walk up and down the scale and even do trills.

The original polycarbonate tubing, when slit, forms into a tight coil and fits nicely into a recorder mouthpiece and is also sqeezable and playable.

The search goes on for tube that can be squeezed and snap back rapidly.

More later; meanwhile....

Hooray for the opposing fingers.

SIAMESE WHISTLE ..... Joined at the Hip

Whistle to a Siamese cat and, unlike a dog, it won't come. But two whistles joined at the hip may get its attention. Two identical whistles (tin, plastic, bamboo ... any size) held together with plumbers epoxy lets you blow both at the same time, or just one. Great for checking the tuning of the two supposedly identical pipes.

Out of tune notes give a beat frequency. Surely, you knew that.*

Now, tape over the top three holes of one of the Siamese twins and blow.

It's a chord. Fingering then lets you play all kinds of chords up and down the scale in about three octaves.

Great for jazz.

SLIDE ..... Just for Kicks

An old trombone slide, rescued from a junk pile at my guy's repair shop, got fitted with a tenor sax mouthpiece at one end and a trumpet bell at the sound-out end. With it, I can play full chromatic scale at a pitch down in the baritone sax range (I don't know why) and can jump octaves accompanied by birdlike whistles. Teeth on the reed gives high pitched blood curdling shrieks,

* But in case you didn't: When two close-but-not-identical frequencies sound together, the two vibrations alternately reinforce and partially cancel one another as the faster one moves in and out of phase with the slower, giving rise to the oscillating rise and fall of loudness known as beating. — ed.

sending vampires into ectasy.

Take the trip .... The scenery sounds fantastic.

POLY DOODLE ..... Old Song, New Material

The wonders of Polycarbonate Tubing have been sung throughout this article.

Now, it's "play it again, Sam" time. A few different variations on that same theme are hummed as follows:

1. A slitted length which coils will fit nicely over 1" PVC pipe, making a good slide for trombonesque things.

2. A short slit length will wrap around a larger tube such as a resonator and can be slud (slided) up and down for fine tuning.

3. The Poly tube itself might make good resonators, tuneable with scissors.

4. A couple of different lengths make good whackers with boing sounds when whacking a hard object such as the top of my head.

5. You'll think of something.

NEON MUSIC ..... Pass The Glass

Neon is a gas and, unlike flatulents, makes no sound. That is not the point of this ramble. The point is that your friendly neon sign maker is a great source of glass tubing. The stuff comes in 4 ft. lengths in several bores ranging from 1/2 inch down to 1/8. Of course, it is in millimeters but we all know how to convert that, don't we?

Mr. Neon will certainly sell you some of this stuff (he buys it 50 pounds at a time) and if you get sufficiently friendly (tell him what you plan to do with it) he will probably give you some for free. Also he might tell you how to cut it and fire polish the ends so there is no blood. My friend is named Jay and he give me a bunch which may become chimes, xylocrystalphone, or pan flutes. Ask for a glass blowing demo and he may gladly oblige. Then ask for some corks to plug the ends in case you are into water things.

Later, go back and show him what you did and he will likely give you more free stuff.

That price is hard to beat !

PYRAMIDAL ..... Power of the Pyramid

A few years ago, I learned that all speaker enclosures have a resonant frequency and must be highly muffled to damp it out. The question is why?

The answer is .... what do you expect of a box with 3 sets of parallel sides?

Imagine putting a little speaker in a 6-sided plywood box and driving the speaker with an audio sine wave oscillator. The thing passes through three fundamentals and all of their harmonics.

It's because the sides are parallel and rectangular, giving plate resonance as well as standing wave stuff.

The fix? A three-sided pyramid! While we are at it, make each of the edges a different length related by prime numbers. That makes it acoustically correct and also mathematically correct.

What a snow job you can do in explaining how it works.

I made one of these a few years back. It was 6 feet tall, contained 15" woofer, several mid-range and a few tweeters. No padding. I had it made out of chipboard at a woodworking shop and painted it with about six coats of lacquer at an auto body shop. It was metallic bronze, a sight to behold.

Because of prime number edges, the thing listed to starboard or to port, depending on your viewpoint. A great eye catcher.

It passed the audio spectrum resonance test with flying colors.

Alas, poor thing, it went the way of all things too big to move from a huge house to a small apartment.

I still know how to design it. Someday, I might make a smaller one just for the ego boost.

PORT OF CALL ..... We Knew Ye !

As *EMI* prepares for shut down in print, you can still find interesting instruments on the Internet. I'm sure that Bart will tell you where. In case he don't, it's www.windworld.com/emi. Go there!

Also there is a forum where like kinds engage in discussion and even debate.

Do a search for MIMForum Their website will be near or at the top of the list.

And so, as the Sun sinks slowly in the West, we are not left high and dry but can find shipmates at other ports of call, all over the Web.

Bon Voyage

My name is Dwin Richardson Craig. All of my banks know my middle name. Sometimes people ask if Dwin is short for something. The answer is No, it's long for DW. I was born in 1920. My e-mail is dw1920@aol.com. Get it? I played saxophone for a living until WWII brought me to my senses, after which I got an Engineering degree and became an inventor, entrepreneur, promoter, etc. on the road from rags to riches to rags.

Being single for the third time in my life, l now do what, when, where and how I want to spend my time and my money. Free At Last!

Inventing, building and playing strange musical instruments is one of about sixteen ongoing projects, all aimed at extraordinary fun in an ordinary world. What a Concept!

For computer ILLs there is little hope, but you computer LITs can drop me an e-mail and I will reply with a link to my website.

My philosophy: DO Something BE something .....
DO BE DO BE DO!!

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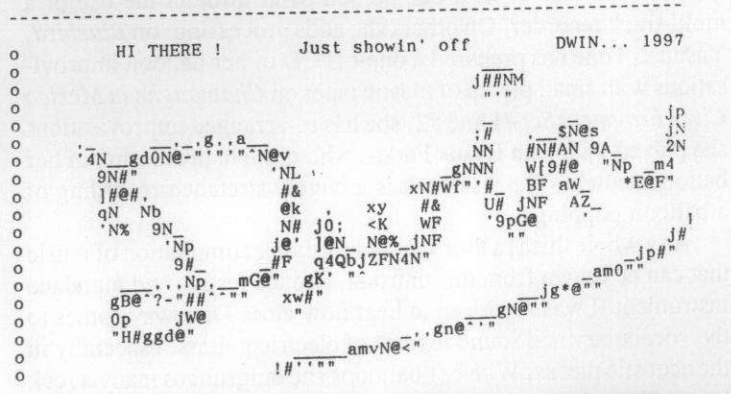

RECORDINGS REVIEWS

By Warren Burt, Mitchell Clark, Dean Suzuki and René van Peer

JUDY DUNAWAY: **BALLOON MUSIC**

CD, CRI CD 778, from Composers Recordings Inc., 73 Spring Street, Suite 506, New York, NY 10012

I can't imagine that anyone who has inflated balloons does not know about their exuberant but capricious sonic qualities. The protracted flatulent raspberry when you let them fly, the variable-pitch squeal when you stretch the mouthpiece sideways between thumbs and index fingers while air escapes through it, amplifying and modifying this squeal by holding the mouthpiece inside the open mouth whilst changing its shape as if pronouncing different vowels, the deep stuttering and scraping when you rub them with moist hands or fingers — balloons are a true delight for an inquisitive spirit.

Since 1990 experimental guitarist Judy Dunaway from New York has explored their possibilities for sound production, and has put what she found to musical use. Over the years she has attained an absolutely marvelous mastery over these unpredictable rubber air sacs. She uses the entire gamut of techniques, and has refined them to a high degree. Rubbing a balloon she controls pitch and timbre by the speed of her movements and by the amount of pressure exerted on it, and achieves microtonal pitch variations by squeezing it between her knees. She may cut the mouthpiece off and use that as her instrument.

Dunaway doesn't leave any room for doubt — the balloon is a musical instrument, and a wonderfully hybrid one at that. As she states on the insert, "an inflated balloon has a resonant body like a classical guitar and vibrational nodes like a timpani. The mouth of the balloon functions like a woodwind reed or a brass player's lips. Rubbing the balloon yields sounds through a stick-and-slip mechanism similar to the bowing of a stringed instrument. Because rubber dampens its own overtones, the pure tones produced by the balloon are similar to those produced by an electronic oscillator. The oral inflection and enunciation into the mouth of the balloon are similar to that used by a singer."

Balloon Music is convincing evidence. All these characteristics can indeed be heard on this CD. Some pieces feature her as a solo player, or as a one-person band through the use of a multi-track recorder. On others she adds processing: on *Bluebird*, Yasunao Tone has prepared a one-off CD of her balloon improvisations with small pieces of plastic tape; on *Champagne in Mexico City - Fragment Set* #1 and #2, she has re-arranged improvisations she played with Dan Evans Farkas who did live processing of her balloon sounds. The last track is a hugely stretched recording of a balloon popping.

As a whole this is a thoroughly gratifying compilation of music that can be drawn from this unusual, at once festive and mundane instrument. I was surprised to hear how close Dunaway comes to the vocabulary and sound texture of electric guitars, especially in the acoustic pieces. With her balloons she outgrunges many a rock band. She achieves an admirable accuracy in her timing and in hitting her pitches, but she also shapes these elements into passionate solos. And I can assure you that the final pop is stunning beyond belief.

—RvP

ANNICK NOZATE: **LA PEAU DES ANGES**

Vand'Oeuvre 9712 (Vand'Oeuvre, c/o CCAM, BP 126, F54504 Vandoeuvre-les-Nancy, France, fax:33 03 83 53 21 85)

Vocalist, instrumentalist and improviser Annick Nozati has released a fine, if not bizarre CD on which she sings, intones, narrates, and chants, frequently with accompaniment provided by "very prepared piano" (how the instrument is prepared, and the meaning of "very prepared" is not discussed in the liner notes) as well as sound sculptures by the Baschets. The music appears to be freely improvised and her vocal techniques invoke the style and techniques of Julie Tippett, Jay Clayton, and Lauren Newton, among others. However, a more lyrical, atmospheric and mysterious air prevails, rather than the frenetic, inchoate style which frequently characterizes free improvisation. Still, Nozati's vocal parts can be angular, screechy, even shamanistic, invoking the strangeness of Shoenberg's *Pierrot Lunaire*. On some tracks, her voice follows the various glissandi of a rubbed Baschet sculpture in a way that is technically extraordinary and musically evocative and mysterious. This is the case in "Suite Grande TÔLE Folle" in which Nozati also uses the Baschet sculptures as resonating objects into which she sings. Of course, it is a pleasure to hear the Baschets' sculptures again. The variety and types of sounds they emit is unexpectedly great, even startling, ranging from distorted wailing, siren-like sounds to rich, sonorous plucked timbres. The prepared piano is used sparingly but effectively to complement, accompany and color Nozati's vocal explorations. And while the liner notes state that the piano is "very prepared," the timbres appear to be rather typical, certainly not extraordinary.

—DS

WILLIAM SETHARES:
XENTONALITY: MATCHING TIMBRE AND TUNING

CD from William Sethares, available from Frog Peak Music, Box 1052, Lebanon, NH 03766. http://www.sover.net/~frogpeak/

William Sethares is well known to long-term readers of *EMI*. A music theorist who has investigated the relationship of timbre and tuning in a number of articles in *EMI*, he has now produced a book on the subject (*Tuning, Timbre, Spectrum, Scale* — Springer-Verlag, London, 1997) and this CD of pieces which illustrate the results of his theories. For the most part, these are far more than mere demonstrations of harmonic/timbral effects — they're full fledged pieces in a variety of pleasant pop and folk idioms. Sethares calls them "songs" on the album, and the overall feeling is of just that — a well crafted pop album of instrumentals

which explore a variety of moods and sounds. But there's more to it than that, because each of these pieces *is* designed to be a sounding proof of Sethares' ideas. And they do that well. The occasional tension between musical style and theoretical demonstration makes this a fascinating album; part ear-puzzle, part easy listening.

Briefly, Sethares' main idea is that if the spectra of the sounds used in a piece matches the scale used for the piece, a greater sense of consonance and dissonance can be achieved than if sounds of normal harmonic-series spectra are used for all scales. For example, if you want to play in 10-tone equal temperament (10-tet), you should stretch the spectra of your sound (using computer synthesis software) so that the harmonics of the sounds you're using *also* fall on the pitches of 10-tet. Or conversely, if there's a sound you like, a bell, for example, by finding out what the pitches are in its spectra, and using those for the scale you play samples of that sound in, you should be able to obtain chords and intervals that sound consonant with that timbre.

To my ear, these effects work, and work well. The instrumental samples with stretched spectra mostly still sound like the instruments in question, just a little brighter, and the harmonies formed in the unusual scales, while a bit strange-sounding at first, soon become quite acceptable and have a feel of harmonic weight and tonal rightness to them. The CD opens with "10 Fingers," an attractive piece in 10-tet using an altered guitar timbre. The folksy sound of this piece is continually undercut by some very nice lurches in the rhythm — just when you think everything is steady — whoops! — there it lurches again. "Circle of Thirds," the second track, likewise explores a harmonic resource of 10-tet not available in our normal 12-tet tuning. There is a definite sense of progression here — you feel pulled along by the harmonies. The portamento on the main melodic line is also a lot of fun — it continually made me smile. In "Glass Lake," my favorite track on the album, spectra are stretched to the point where the samples used lose their timbral identity. In this piece, guitar, bass, and flute samples are mapped to the spectra of a tom-tom sound, and then played in the scale implied by the spectra of the tom-tom. The results are quite beautiful, and have a real feeling of tonality, though no "tonal" intervals are present in the scale. Similarly, in "Tingshaw," a small handbell is sampled and analyzed, and a scale built from its internal structure. Bright and pulsy, the heavily reverberated samples leave absolutely luscious clouds of harmony in their wake. Two plucked-string pieces, "Seventeen Strings" for celtic harp samples remapped to 17-tet, and "Truth on a Bus," for guitar samples remapped to 19-tet, are extremely attractive folk-influenced pieces. The celtic harp piece is poignant and wistful, while the guitar piece should go into the repertoire of Ry Cooder, or better still, Neil Haverstick. And several of the pieces, "Duet for Morphine and Cymbal," "The Turquoise Dabo Girl," and "Saint Vitus Dance" should be grabbed by some enterprising filmmaker for the soundtrack of their next mystery or spy thriller!

Two quibbles. The pieces I liked the least were the ones that had a very traditional "bass line and drums as harmonic support" feel to them. At first I thought this was just a stylistic prejudice on my part (you know, they sounded too "normal" for my tastes), but on further listening, I realized that that wasn't the main reason these pieces pleased me less than the others. It was that the sound of an electric bass and synchronized drum line is such a heavy-handed way of saying "this is tonal" — we are bludgeoned with this sign of tonality every time we walk into a shop, or turn on the radio — that any chance I had of hearing if the matching of timbre and tuning *really* worked in these cases was obliterated by the incessant bass line, which established its own sociological sense of tonality and dominance. Which is not to say that these pieces were unpleasant, just that the pieces without the rock bass line seemed to be more subtle, and the music in them held my interest more, both as music *and* as effective theoretical demonstrations. Also, the inharmonic spectra of the samples, and the bright equalization on the CD seemed to induce a sense of aural fatigue in me about halfway through each time I listened to the CD. An interesting experiment would be to turn down the treble a bit on the playback equipment to see it this effect still happened. Perhaps the subtle inharmonic spectra of the instrumental samples need to be equalized differently to avoid this, though I should make clear that I'm just speculating here.

Despite the above two quibbles, I have no hesitation in recommending this fascinating CD to those interested in getting a first glimpse into this potentially infinite new world of harmonic exploration. William Sethares has opened up some amazing new harmonic territory, and these songs are the first artistic fruits of that labor.

— WB

GEORGE SMITS: **ZBOLK NIGHT RADIO**

CD from Audioview Audio 002. Lowlands Records, Hoornstraat 6, 2000 Antwerp, Belgium (e-mail: lowlands@innet.be)

The Belgian sound artist George Smits, who died in 1997, made sculptures of bamboo canes, steel wire, heavy steel springs and styrofoam. Large though they could be, they were actually quite frail. Spectators could feel inspired to hit the wires or the springs, damaging the pieces in forceful efforts to draw sounds from them. Smits's sculptures were not capable of producing loud sounds, but one gentle tap on a spring would launch vibrations on a trip along the wires to the bamboo poles that were inserted in styrofoam blocks. These, in turn, would start to hum, emanating the conglomerate of tones generated in the spring as a rich sonic glow. Styrofoam, it turns out, is great resonating material.

He had ambitious plans to write about his work for *EMI*, but never realized them. As far as I know no recordings of his sound sculptures were released on CD until the Belgian label Lowlands decided to put out *Zbolk Night Radio*. It is named after a weekly program he made for the local station Radio Centraal in Antwerp, recorded, mixed and broadcast live in the dead of night. And indeed, one can easily imagine this music to arise out of the subterranean deep dark pools of phantasmagoric insomnia. The distorted reverberating sounds from cheap keyboards or from records he mixes in, the canned drums, the mix that hauls one musical sequence over another and shoves out a third — it is as if you are wandering around Smits' waking dreams.

Only the first two tracks apparently feature his sculptures as they are, amplified but not subjected to any further processing. Hitting the wires in *Repercussions* he sends delicate twangs back and forth through the various components of one of his pieces, ending in a quickly quaking succession of thuds. This is followed by *Acoustic solo* in which he plays a coil spring as described above, resulting in veils of shimmering mercurial sound. Recordings of his sculptures are among the sound sources he used in his live radio mixes, although their prominence varies. What seems to have been more important is the way in which these sculptures worked as sound processors. On most tracks the aesthetic of reverberant and the enveloping sounds must have defined the eventual musical outcome. One particularly fragile and moving

track harks back to the 1960s when he played the harmonica in Antwerp's foremost folk band — one lone person giving voice to feelings of melancholy with a harp and a guitar.

So what you're listening to is George Smits' personal sound world, unhindered in its development. The artistic freedom on *Zbolk Night Radio* is both an endearing quality and a flaw. Some tracks are definitely more effective than others, and personally I would have liked this CD to document more of his sculptures proper. On the other hand, should you find yourself awake well after midnight and unable to fall asleep again — this is the perfect record to suit that mood.

— RvP

MUSICAL INSTRUMENTS OF THE WORLD

CD (+ booklet with 52 pages of pictures and 30 pages of text), Le Chant du Monde LDX 274675, distributed by Harmonia Mundi

Released in 1990, this CD is not exactly brand new. It is an augmented and revised re-issue of the vinyl album *Les Instruments Traditionels*, providing an overview of instruments from the four main groups (chordophones, membranophones, aerophones and idiophones) as they can be found in traditional music. With 36 tracks this is a real cornucopia, a nosegay of goodly proportions. After a brief general introduction the text gives information on the individual instruments featured on the CD and the pieces played on them. The information is not always satisfactory. In a clarinet ensemble of the Wayâpi Indians from French Guinea the instruments are tuned microtones apart. On the evidence of other recordings of these people my guess is that this is deliberate. This would have been worth going into, in my opinion. I would have liked at least to see the question asked of these people whether this tuning is indeed deliberate and, if so, what their motives might be — is this purely aesthetic or does it serve a function?

The main problem with albums such as these is that they whet the appetite of the listener. One would just love to be able to hear more of the featured instruments, such as the brazenly dissonant trumpet ensembles of the Central African Banda people, the *murali* double clarinet (one for the melody, one for the drone) from Rajasthan with its seductive glissandos and bagpipe-like hiccups, the exquisite tinkling Vietnamese *dan tranh* zither. What is even worse is the inclusion of thirty pages of pictures. My personal favorite is the *sasando*, a tube zither with resonator from the Pacific island of Timor. The strings and tuning pegs are set around the tube, movable bridges spiral upward, and around this is a conical half open cloak of overlapping husks. Just like most of the other pictured instruments it is not included on the CD itself, so you are left to guess what it may sound like. It would have been a good idea if the editors had referred the slightly frustrated enthusiast to other albums for further listening.

Impressive though this compilation may be, it is far from exhaustive. There is no way it could be, but it is biased a bit too heavily towards Asia and Africa where thirty of the tracks were recorded. And with such a large number of tracks the average length is rather short at two minutes. On the whole *Musical Instruments of the World* is impressive, however, because of the many glimpses it provides of the timbral diversity encountered outside the Western musical world. More than that, these fragments attest to the human inventiveness in shaping beautiful and often astonishingly complex music.

—RvP

ANTHOLOGY OF WORLD MUSIC — CHINA

Rounder Records CD 5150

The new *Anthology of World Music* series on Rounder is a reissuing of materials from the UNESCO collections previously published in Europe on LP (by Bärenreiter and Musicaphon) and on CD (by Auvidis). This series is of great interest as it will include many fine recordings of musical instruments of the world. It should also place Rounder Records at the forefront in the United States of CD releases of traditional world music.

The release of classical instrumental music of China is one of the initial presentations of this series. The album focuses on the three major plucked-string instrument traditions of China, those of the *qin* and *zheng* zithers and the *pipa* lute. The original UNESCO release for this album contained six tracks drawn from recordings produced by the China Record Company in the later 1950s (see below, Supplementary Discography, item #1, for LP, and Item #2 for first CD reissue). The album features some the most important Chinese musicians of that period. For this Rounder reissue, these six tracks have been augmented by the inclusion of a more recent recording of the contemporary *qin* player Wu Wenguang.

Among the *qin* recordings, two are by the great master Guan Pinghu (1895-1967). One of these, the well-known *Liushui* ("Flowing Waters"), is commonly available in performances by Guan, and has appeared (by my last count) on some seven CDs (not to mention the record on the Voyager spacecraft, itself at one time published here on earth as a CD-rom). On the other hand, the additional Guan contribution, *Ao-ai* ("Fisherman's Song"), is rarely encountered. Essentially the rarest item on the album is the duet of *qin* and *xiao* vertical flute on the piece *Meihua San Nong* ("Ode to the Plum Blossom"), performed by Fu Xuezhai (1893-1966; his surname also commonly read as "Pu") — who left only a few recordings — and Zha Yiping (1895-1976). Better known as Zha Fuxi, the latter is also one of the great mid-century *qin* players; he used the literary name Yiping in this context of *xiao* playing. It is the only recording I know of of Zha playing *xiao*, and although he was not the master instrumentalist on *xiao* that he was on *qin*, this pairing of Fu and Zha in a *qin-xiao* duet is a valuable glimpse into the traditional world of this literati music genre. The recording of Wu Wenguang (born 1946) playing *Guangling san*, although it's not documented in the album's notes, is probably from Wu's release on China Records from the early 1980s, *Xiao Xiang Shuiyun* (#3 & #4; another recorded performance by Wu of *Guangling san* may be found on #5). This additional track becomes the longest one on the collection, and is an important recording of this most massive (and possibly most ancient) of *qin* pieces.

In addition to the *qin* recordings are two of *pipa* and one of *zheng*. The *pipa* pieces are both of the *wu*, or "martial," style of *pipa* music. The *wu* style is characterized by a bravura programmatic style, depicting stories of military prowess (this distinguishes it from the more sedate *wen*, or "literary," style). Chen Zeming performs *Haiqing Na Tian'e* ("Haiqing Seizing the Swan") and Li Tingsong (1906-1976) performs *Shimian Maifu* ("The Great Ambuscade"), the latter item being perhaps the most famous piece in the *pipa* repertoire. The *zheng* is the least well represented of the three stringed instruments featured on this album, with one short piece, *Pingsha Luo Yan* ("Geese Landing on a Sandy Beach"), performed on a wire-strung *zheng* by Ding Boling (1938-1981). Originally a *qin* piece, *Pingsha Luo Yan,* has long been immensely popular, with its programmatic repre-

sentations — more or less stylized — of the rustling wings and cackling voices of a flock of geese. The performance by Ding Boling is outstanding, but unfortunately the recording is marred by a pulsating background hum.

In its drawing on instrumental recordings from the vaults of the China Record Company, this album is similar to the CD collection *Chine — Musique Classique* on Ocora (#6). Whereas the Ocora release includes many more tracks, featuring a wider variety of instruments, the present UNESCO/Rounder album includes a greater concentration, and of longer pieces, of performances on the principal plucked-string instruments. In this way the two collections effectively compliment each other.

The Rounder release includes a few errors in its liner notes. They are minor — the "*xian*" of the instrument name *sanxian* (a three-stringed lute) is hyphenated although it is a single syllable (p.29); in a citation, the title of the book *Qin fu* is called *Qinpu* (pp.7 & 26); and so on — but they do show some of the errors in accompanying text which, in the transferral from the UNESCO editions, may find their way into the texts of these Rounder releases if they are not well edited. An advantage to the Rounder booklets — that is, unless you speak only French— is that by dropping the French-language version of the notes, a less-cramped presentation of the photographs, diagrams, and English text itself is possible. In fact, in the Rounder China collection, the booklet is able to include some of the illustrations from the original LP release that had been dropped from the Auvidis/UNESCO CD edition. Concerning the covers of the booklets in this series (which, of course, double as the covers for the CD themselves), my complaint would be that the murky, digital-collage design of the background is unattractive, and will quickly look dated. But... all in all, we have much to look forward to in this major re-release of some of the core recordings of world music.

SUPPLEMENTARY DISCOGRAPHY

1. Various artists: *Unesco-Collection — China*; Musicaphon/UNESCO (A Musical Anthology of the Orient) BM 30 SL 2032 (1985) [LP] Liner notes in English and French

2. Various artists: *Unesco-Collection — China*; Auvidis/UNESCO (A Musical Anthology of the Orient) D 8071 (1996) [CD] Liner notes in English and French

3. Wu Wenguang, *qin*: *Xiao Xiang shuiyun*; China Record Co. (Zhongguo Changpian) HL-104 (1982) [Cassette] Liner notes in Chinese

4. Wu Wenguang, *qin*: *Xiao Xiang shuiyun*; China Record Co. DL-0074 (1983) [LP] Liner notes in Chinese and English

5. Wu Wenguang, *qin*: *Music of the Qin*; JVC VICG-5213 (1992) [CD] Liner notes in Japanese and English

6. Various artists: *Chine — Musique Classique*; Ocora C 559039 (1988) [CD] Liner notes in English and French

Note: Many of the original early China Record Company *qin*, *zheng*, and *pipa* recordings (which appear on the Rounder release and on Supplementary Discography items 1, 2, and 6) have also appeared over the years on a number of releases by the Art-Tune Company of Hong Kong and Queen Record Company of Taiwan (as well as on other Western releases). Over the years I've seen 10" and 7" vinyl releases, as well as cassettes, from Art-Tune, and 10" vinyl releases from Queen (these latter, curiously enough, on color vinyl). Many of the recordings appear now also in CD form in releases from the People's Republic of China and from Taiwan. All of which is to say that this material has seen a lot of (well-deserved, although sometimes with performers uncredited) circulation.

— MC

NOTICES

Earthshaking Music '98 Catalog is now available (FREE!). Nearly 1000 cd, book and video titles of the best in world music. New shipments of instruments from Africa, India, Bolivia. Visit us in Atlanta at our new store, or on-line at www.earthshakingmusic.com. Email erthshkn@avana.net or call 404-622-0707. [14-1]

Dr. Guy Grant has started the Oddmusic e-mail list for anyone interested in experimental, ethnic and unusual music and instruments. To subscribe to this free list go to the Onelist Main Page at http://www.onelist.com and enter the name of the list you wish to join (Oddmusic). The earlier Oddmus list on the Coollist server is gradually being phased out. [14-1]

Pat Missin would like to correspond with anyone interested in mouth-blown free-reed instruments, including both Eastern free-reed instruments and free reeds in the western tradition, such as harmonica. Pat Missin, Cambridge House, Ings Lane, Dunswell, Hull, HU6 0AL, England; email patm@globalnet.co.uk. [14-1]

Send your $20 check to: DWIN, 6971 Rooks Ct., Frederick MD, 21703. You get color pictures plus cassette of sounds of many DWINSTRUMENTS (see "Browsing" article in the Sept '98 issue of EMI). I trust YOU, you trust ME. What a concept! [14-1]

ANNOUNCING THE RELEASE OF BOOK AND CD: **Wisdom of the Impulse: On the Nature of Musical Free Improvisation**, a new book by Tom Nunn, and **Peering Over**: The Edgewater Experimental Instruments Consort, a new CD featuring 15 of Nunn's instruments with 15 players in live performance. $30 + $5 shipping for the book; $10 + $2 shipping for the CD. Payable to Tom Nunn, 3016 25th St., San Francisco, CA 94110. [13-4]

Seeking information: If you have information about bamboo saxes, or other sorts of unusual sax-like instruments, builders, history, references, anywhere in the world, please contact Ángel Sampedro del Río, Scalabrini Ortiz 1960, Villa Adelina (1607), Buenos Aires, Argentina, fax [international code, plus] 541-794-3880; email bambu@arnet.com.ar [14-1]

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WANTED: Unusual musical instrument acts to be featured in an upcoming motion picture. Must be unique & visually appealing, from 3 to 5 minutes long. Could be funny, weird or outrageous, and preferably have a climax payoff. Contact Larry Wright, 15382 Andaman Ln., Huntington Beach, CA 92649. [13-4]

RESEARCHING "ONE MAN BANDS." Mandolinist/journalist Niles Hokkanen is researching the subject of "one man bands" and musicians who perform on 2 or more instruments simultaneously. Niles would like to talk to these types of musicians about their setups, how they solved physical multi-instrumental dilemmas, why they began performing multiple musical functions, and the mental learning processes involved. Photos, recordings (commercial or cassette demos), etc. can be sent to Niles Hokkanen, PO Box 3585, Winchester, VA 22604; phone (540) 722-9429; email mandoman@monumental.com (Niles who is a notable mandolinist, also plays midi-bass pedals and foot percussion/drum-kit and has constructed portions of his own gear.) [13-2]

Reed Ghazala's **Anti-Theory Workshop** is now offering circuit-bent Incantors, Trigons, Photon Clarinets, Morphiums, Aleatrons, one-of-a-kinds, CDs and collected writings. For Reed's full-color, visually stunning brochure/catalog/fractal artwork depicting 18 instruments, CDs, friendly raccoons and more, please send $1 (or any interesting tidbit of your choice) to: Reed Ghazala c/o **The Anti-Theory Workshop**, Sound Theater, 3325 South Woodmont Ave. Cinti., OH 45213. Present web: http://www.iac.net:80/~cage/reed.html. Coming soon: http://www.anti-theory.com E-mail: qrg@anti-theory.com

GRAVIKORDS, WHIRLIES AND PYROPHONES --book-and-CD boxed set from *Experimental Musical Instruments,* produced in conjunction with the publishing company Ellipsis Arts. A book-and-CD combination devoted to new and unusual musical instruments from some of the world's most interesting and inventive instrument makers. Informative text, wonderful photographs and great recordings. Every track of the CD and page of the book overflow with the ideas and the originality of the featured builders. 37 musical instrument makers appear in the book, with music from 18 of them included in the CD. Price $29.95 for the book and CD (no shipping charges for U.S. air mail or overseas surface rate; add 25% for overseas air; California residents only at 7.25% sales tax), available from EMI at PO Box 784, Nicasio, CA 94946, USA; phone/fax (415) 662-2182; e-mail EMI@windworld.com Visa & Mastercard accepted.

Musical Instrument Design: Information for Instrument Making, by Bart Hopkin, editor of *Experimental Musical Instruments,* published by See Sharp Press. *Musical Instrument Design* presents underlying principles for the design and construction of acoustic musical instruments of all sorts, with a practical, hands-on approach. No other book gathers this information under one cover. Just under 200 pages long; large format; fully illustrated. $18.95 plus $2 s&h. (This covers shipping charges for U.S. air mail or overseas surface rate; for overseas air add another 25%. Customers in California add 7.25% sales tax.). Order from *Experimental Musical Instruments*, PO Box 784, Nicasio, CA 94946, USA, phone/fax (415) 662-2182, email EMI@windworld.com.

The EMI Wall Chart is a beautiful 24"w x 36"h wall poster, with graphic design by Gwendolyn Jones, covered with practical reference information relating to musical instruments and instrument making. Suitable for the workshop or living room. Some of the material on the chart replicates material in the *Musical Instrument Design* book (see previous ad), but since the wall-chart format has its own advantages, you might be happy to have both. The price is $12. (No shipping charges for air mail within the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax.) Order from *Experimental Musical Instruments,* PO Box 784, Nicasio, CA 94946, USA, phone/fax (415) 662-2182, email EMI@windworld.com.

Making Simple Musical Instruments: A Melodious Collection of Strings, Winds, Drums & More — A book by Bart Hopkin, editor of *Experimental Musical Instruments*, published by Lark Books. It is a collection of plans for home-buildable musical instruments, ranging in difficulty from simple to moderate. The book is written for a general, non-specialist audience, and the approach is non-technical. The instruments aren't so very far out: most of them relate to familiar instrument types and are playable as such. Yet even experienced experimenters will find some new ideas here. It's hardbound, with 144 big and very full pages, lots of color, beautiful photos & illustrations; price $24.95 plus $2 s&h. (This covers air mail within the U.S. or overseas surface rate; for overseas air add 25%. Customers in California add 7.25% sales tax.) Order from Experimental Musical Instruments, PO Box 784, Nicasio, CA 94946, USA, phone (415) 662-2182; email EMI@windworld.com. Visa/MC accepted.

Air Columns and Toneholes: Principles of Wind Instrument Design is a spiral-bound booklet containing the four articles on practical wind instrument acoustics by Bart Hopkin that appeared in EMI in 1992 and 1993. The articles have been revised and improved, and there are several additional features included. Published by Tai Hei Shakuhachi; available for $14.00. (This covers air mail shipping within the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax). Order from EMI, PO Box 784, Nicasio, CA 94946, USA, phone (415) 662-2182; email EMI@windworld.com. Visa/MC ok.

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SUBSCRIPTIONS TO EMI: $24/yr for U.S.; $27/yr for Canada & Mexico; $34/yr overseas. IMPORTANT NOTE: EMI will publish its last issue of the quarterly journal with the June 1999 issue. (Other facets of EMI's operations will continue in full force.) In ordering subscriptions during this last year of publication, you can choose:
1) Get a full year's subscription at the regular prices indicated above, backdated to include all four issues for the year, or
2) Get a part-year subscription at pro-rated cost, as follows: Through October '98, three remaining issues at $18 in the US, $20.25 Canada & Mexico, $25.50 overseas. Through Jan '99, two remaining issues at $12 in US, $13.50 Canada & Mexico, $17 overseas. Through April '99, one remaining issue at $6 in US, $6.75 Canada & Mexico, $8.50 overseas.
(Even after June 1998, you'll still be able to purchase any or all of the issues you missed as back issues -- see the information in the next ad.)
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EMI BACK ISSUES: Bound volume sets Vol 1 through Vol. 12: $17 per volume. (Each volume set contains all of the issues of one volume year, photocopied and bound under one cover. The photocopies are a step down in quality from the original press runs, but they are decent as photocopies go, and they are fully readable.) Individual back issues from Volume 13 and later are available in the original press run at $6 each. These prices cover air mail shipping within the U.S. or surface rate overseas; for overseas air add 25%. Customers in California add 7.25% sales tax. Visa and MasterCard accepted. Order from EMI, PO Box 784, Nicasio, CA 94946, phone/fax (415)662-2182, email emi@windworld.com, or write for a listing of back issues and their contents. Corresponding cassette tapes are available for later volumes; see information below.

CASSETTE TAPES FROM EMI: Each cassette in the EMI cassette series contains music of instruments that appeared in the newsletter during the corresponding volume year, comprising a full measure of odd, provocative, funny and beautiful music. Volumes 6, 8, 9, 10 11 12 and 13 are available. (Vols 1 - 5 and 7 are sold out). The price is $8 per cassette. No additional shipping charge for air delivery in the U.S. or surface delivery overseas. For overseas air add 25%; in California add 7.25% sales tax. Order from EMI, Box 784, Nicasio, CA 94946; phone/fax (415)662-2182, email emi@windworld.com. Visa and Mastercard accepted.

The following is a list of selected articles relating to musical instruments which have appeared recently in other publications.

"Observations of a Studio-Wary Glass Player" by Ed Stander, in *Glass Music World,* Spring 1998 (2503 Logan Drive, Loveland, CO 80538)

A player of musical glasses discusses the challenge of obtaining an attractive and natural-sounding tone quality in recordings of the instrument, and reveals the studio tricks that yielded satisfying results for him.

"Wood: Your Harp's Most Valuable Resource" (no author credited) in *Harp Today*, Spring 1998, Volume 2 (Lyon & Healy Publications, 168 N Ogden Ave, Chicago, IL 60607)

A discussion of the woods used in Lyon & Healy harps.

"Selecting a Jew's Harp," by Wayland Harman in *The Pluck-n-Post* (Jew's Harp Guild, PO Box 92, Sumpter, OR 97877)

Suggestions on what to look for in selecting a Jew's harp, with lots of peripheral information on how the instruments work, repairs, and the like.

"The Early Piano," by Ron Moir in *Continuo*, April 1998 (PO Box 327 Hammondsport NY 14840).

Photos and diagrams of early piano actions, accompanied by text describing them and providing historical context.

"Des Structures Sonores Baschet," by Bernard Baschet, in *Percussions* No 56, March/April 1998 (18, rue Théodore-Rousseau, F-77930 Chailly-en-Bierre, France).

Bernard Baschet describes wonderfully inventive instrument designs and acoustic systems in glass and metal created by him and his brother François since 1952. (In French)

"Des Percussions Wagogo Gogo (Tanzanie)" by Polo Vallejo, in *Percussions* No 57 (address above).

A report on percussion instruments among the Wagogo people in Tanzania, including hand drums, xylophones, lamellaphones and more. (In French)

"Barrelorgan," in *LogosBlad*, April 1998 (Kongostraat 35, B-9000, Ghent, Belgium)

Information on barrel organ design. (In Dutch)

"Drumm Don't Strum" by Peter Margasa, in *The Reader,* May 29, 1998

A short article and photo on Kevin Drumm, who uses drumsticks on a prepared and altered electric guitar.

"Gemeinhardt Flute Turns 50," no author credited, in *The Music Trades*, February 1998 (80 West Street, PO Box 432, Englewood, NJ 07631).

A report on the Gemeinhardt flute company, and what it takes to assemble 257 discrete metal parts into a playable musical instrument.

"The Reason Why DW Drums Sound So Good," no author credited, also in *The Music Trades*, February 1998 (address above).

A report on the Drum Workshop company, and what it takes to assemble a variety of wood and metal parts into a good-sounding snare drum or tom tom.

FoMRHI Quarterly #91, April 1998 (171 Iffley Rd., Oxford OX4 1EL, UK) contains "comms" (short, informative writings from readers) on hurdy gurdy, recorders, bowed strings and more. Particularly interesting to *EMI* readers will be a discussion on 19th-century North American blowhorns — rudimentary but perfectly playable natural horns commonly fabricated by local tinsmiths.

MusikTexte 73/74 1998 (Gladbacher Strasse 23, Postfach 10 24 61, D-50464 Köln, Germany) has a special focus on the late expatriate American composer for player piano, Conlon Nancarrow, with many articles on diverse facets of his work.

Woodwind Quarterly (26911 Maple Valley-Black Diamond Hwy, Maple Valley, WA 98308), has reappeared after a hiatus of a year or so, with Lawrence Kirmser taking over as editor. The new issue 15, 1st Quarter 1998, shows an emphasis on practical information for woodwind makers and repairers, with articles on recorder voicing, leak lights and other woodwind repair tools, instrument repair facility business management practices, and many facets of repair work for the standard single reeds, double reeds and flutes. There's also a fine article addressing the question of alternative woods in place of the increasingly scarce tropical hardwoods traditionally used for classical woodwinds.

Vierundzwanzigsteljahrsschrift der Internationalen Maultrommelvirtuosengenossenschaft. (VIM) #7, 1998 (601 N. White St., Mt. Pleasant, IA 52641-1327) has appeared, filled with articles on the trump (Jew's harp) and its surrounding literature and culture worldwide.

Musicworks #70, Spring 1998 (179 Richmond St. West, Toronto, Ontario, Canada M5V 1V3) is bears the legend "Listener as Composer and Composer as Listener" on the cover, and features a special focus on musicians in interaction with environmental sound.

CAS Journal Vol. 3, No. 5 (Series II) (112 Essex Ave., Montclair, NJ 07042-4121) offers a generous helping of articles on acoustics of violin and other string instruments.

American Lutherie #53 and #54, spring and summer 1998 (8222 South Park Ave., Tacoma, WA 98408-5226) present the usual complement of well written and informative articles on the making of guitars and other string instruments. Of particular practical value in #54 is an extensive listing of sources for lutherie tools and hardware.